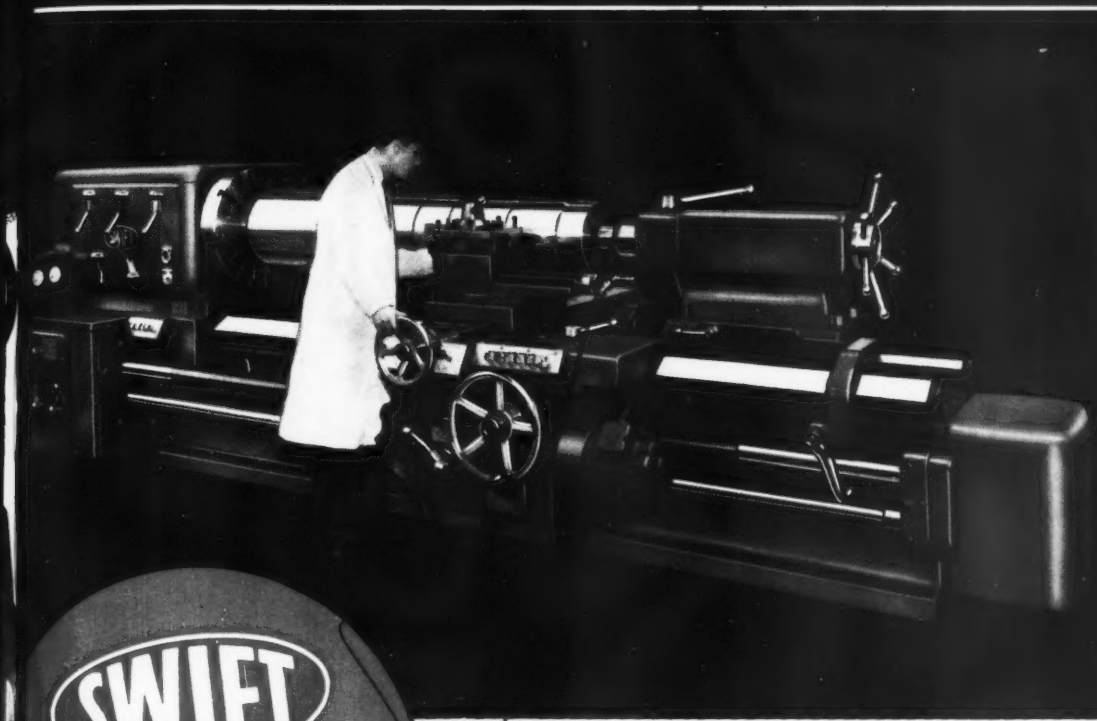
# MACHINERY

MARCH 8, 1961 ONE SHILLING & THREEPENCE


SWIFT

HEAVY DUTY LATHES

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TECHNOLOGY DEPT

Swift Heavy Duty 'Centre' Lathes of modern design are available in a wide range of standard sizes with capacities up to 72 in. swing over bed and 17 ft. between centres. Machines with greater bed length supplied if required.

The lathe illustrated is a 'C' type with 33 in. diameter swing and capacity between centres 7 ft. 9 in. It has 27 spindle speeds, 18 through gearing from 5 to 250 r.p.m. and 9 through a belt drive direct onto the spindle giving speeds of 240 to 1,500 r.p.m. A 30 h.p. motor is fitted.

*Write today for full details of Swift Lathes mentioning the type of work and capacity which interests you.*

GEORGE SWIFT & SONS LTD

HALIFAX · ENGLAND

*Member of the Asquith Machine Tool Corporation*

*Sales and Service for the British Isles*

**DRUMMOND-ASQUITH LIMITED**

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EDWARD HOUSE, NEW ST., BIRMINGHAM *Phone: Midland 3431. Also at LONDON Phone: Trafalgar 7224 & GLASGOW Phone: Central 0922*

ASQUITH

# 3PS - *The Radial of Advanced Design*

Compact grouping of controls, special form of spindle mounting ensuring rigidity and accuracy of spindle alignment. Pillar and sleeve construction with precision locking arrangement — These and many other features are embodied in the 3PS type radial which is designed for maximum production and highest efficiency. Drilling Capacity up to 3in. dia. from the solid in steel, continuously. Maximum radius up to 12ft.

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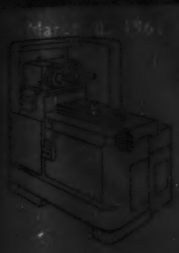
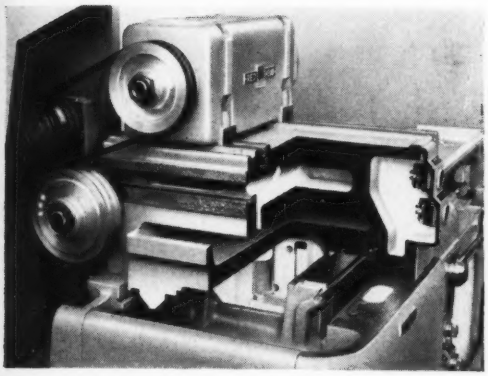


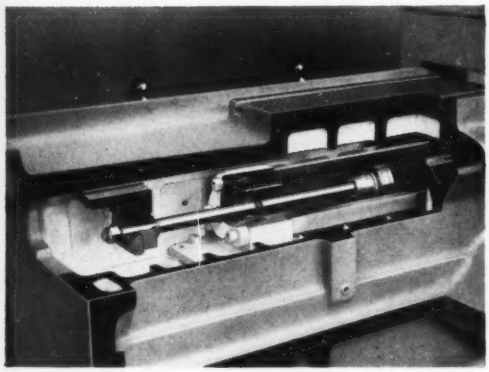
# HERE'S HOW HEALD BOREMATICS

## achieve ACCURACY



**FIRSTLY...**

by dissipation of heat through cored passages whilst retaining heavily ribbed construction for work and fixture support.



**SECONDLY...**

through positive table travel provided by special, distortion-free cylinder and piston mountings

**AND—ALSO BY USING...**

precision boring-head construction
fully automatic lubrication
constant feed throttling
isolated hydraulic power unit.

*You'll find IT PAYS to come to—*

# HEALD

**HEALD MACHINES LIMITED · BIRMINGHAM 24 · ENGLAND**

*Sales Representatives:* **ALFRED HERBERT LIMITED · COVENTRY**

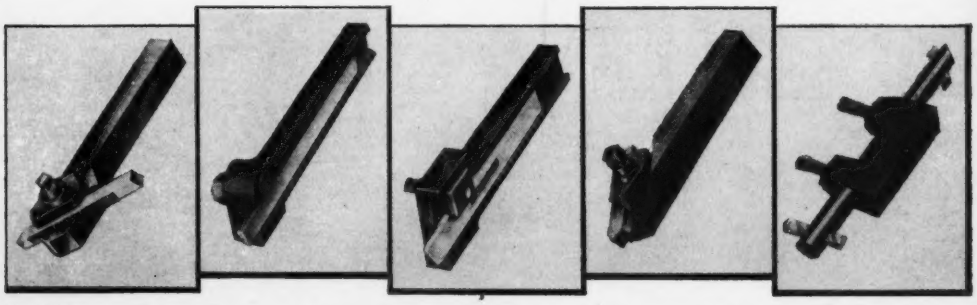
Eclipse

# tool bits, lathe tools and tool holders

## *with many special features*

"Eclipse" tool holders are manufactured with the utmost care from high quality materials, are carefully heat treated and incorporate a number of special features which enable them to do their job superbly well.

To complete the list of tools for turning and metal cutting, there is also the extensive range of "Eclipse" tool bits and lathe tools. Made from "Eclipse" H3 cobalt High Speed Steel, these tools are carefully heat treated to give the perfect combination of hardness and toughness — tools which can be relied upon to maintain a keen cutting edge.



MADE BY

'Eclipse' hacksaw blades and other tools are made by James Neill & Co. (Sheffield) Ltd., and are obtainable from all tool distributors.

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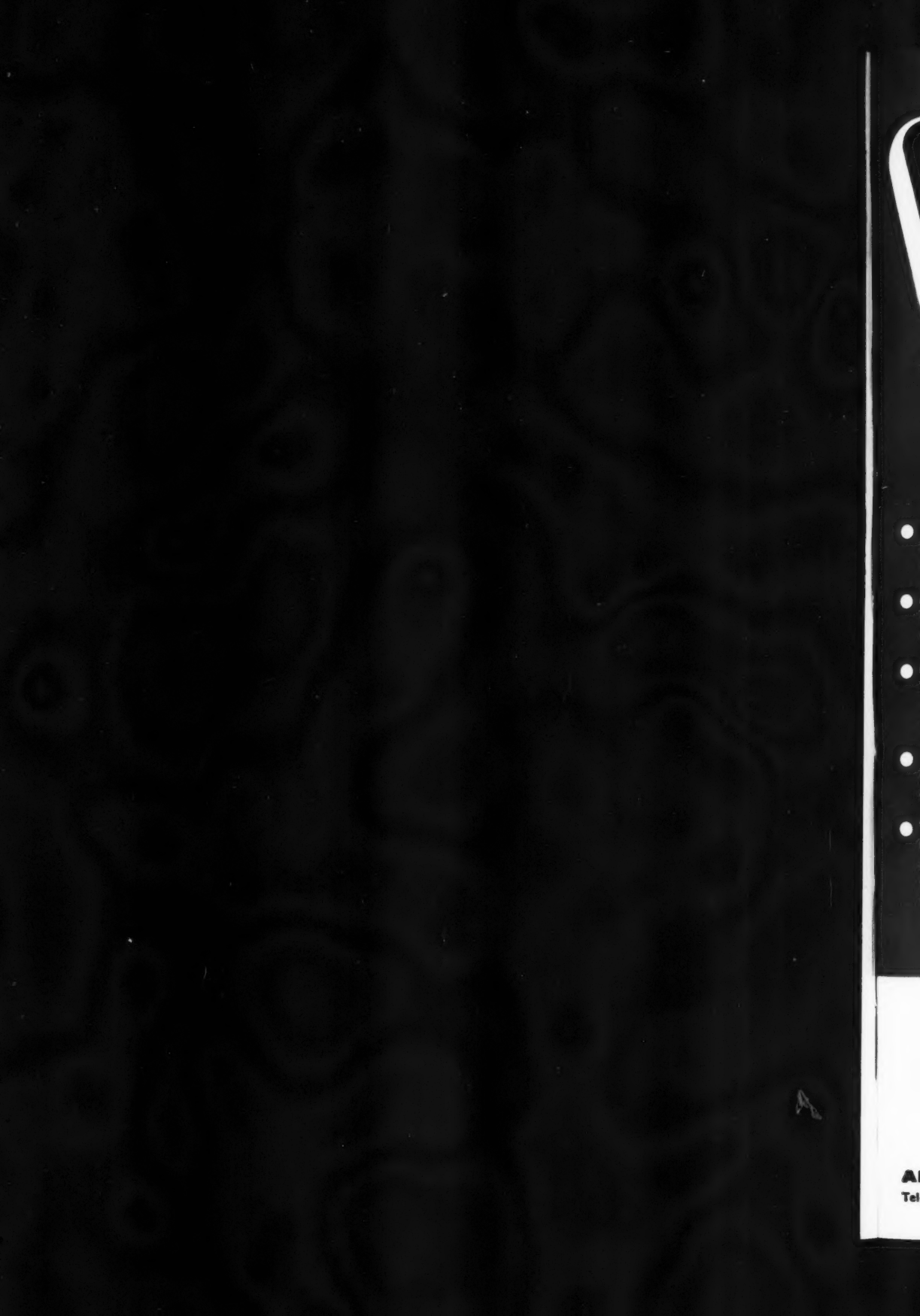
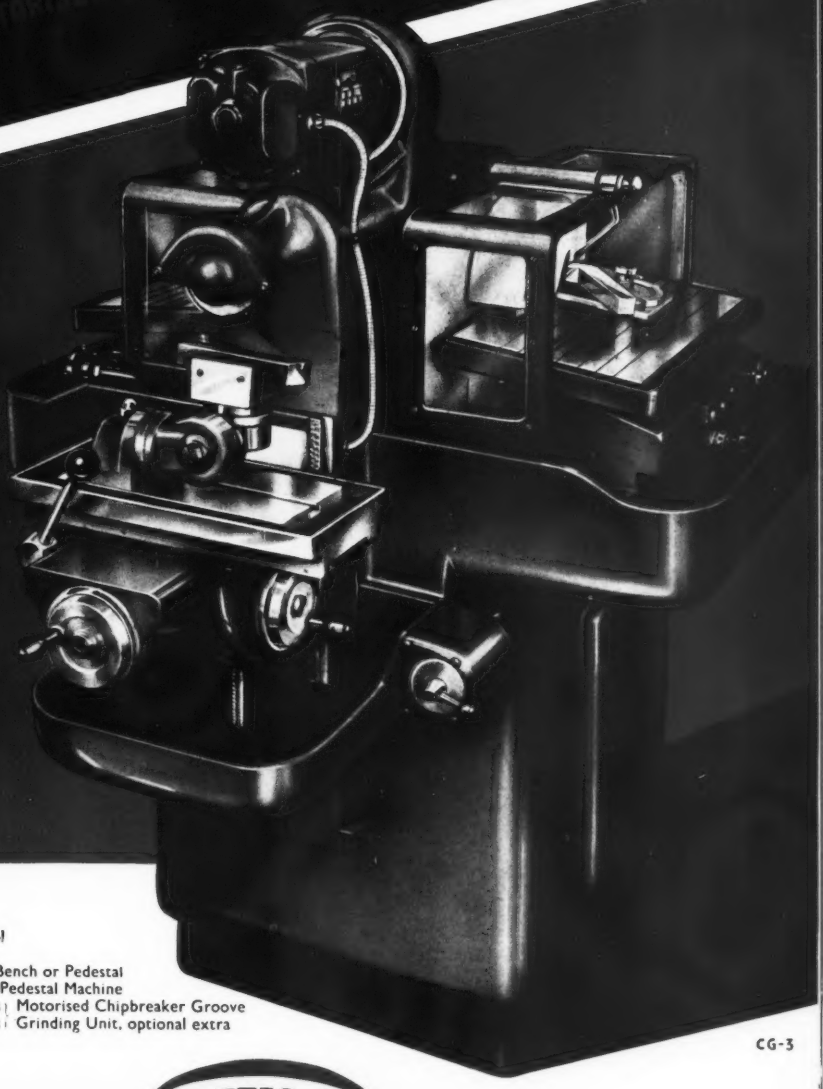


# ABWOOD 'CONCENTRE' CARBIDE TOOL GRINDER

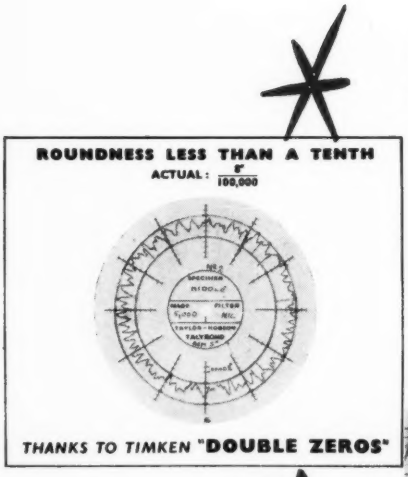


- Constant centre height of table to grinding point irrespective of angle
- Adjustable taper roller bearings eliminate end float
- Perspex panelled spray guards provide perfect vision, hinged for easy access to wheel
- Uses diamond wheels to their maximum efficiency
- The Chipbreaker Groove Grinding Unit accommodates turning tools of most shapes and sizes

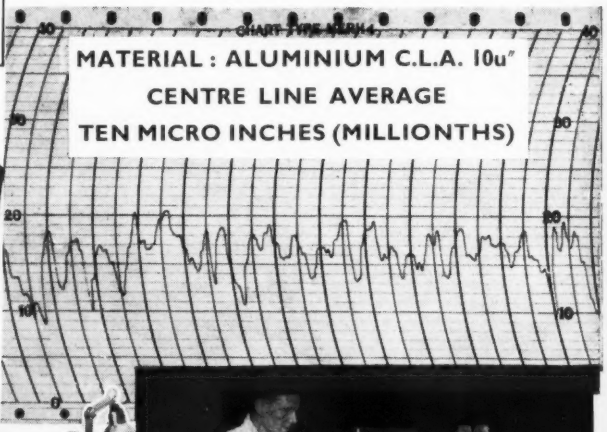
Our full range of Carbide Tool Grinding Machines includes:
**Model CGO,** 6 in. Wheels, Bench or Pedestal
**Model CG1A,** 8 in. Wheels, Pedestal Machine
**Model CG2A,** 8 in. Wheels } Motorised Chipbreaker Groove
**Model CG3A,** 12 in. Wheels } Grinding Unit, optional extra

CG-3

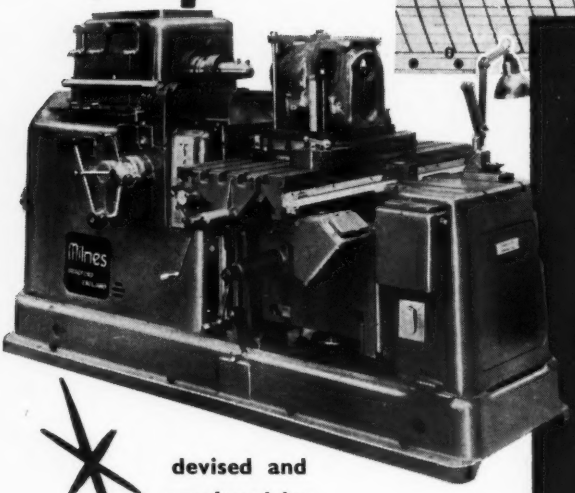
**ABWOOD MACHINE TOOLS LTD., CHURCHILL WORKS, LONGFIELD ROAD, DARTFORD, KENT**
**Telephone : DARTFORD 25271 (5 lines)** **Telegrams : ABWOOD, DARTFORD**




**the advantages of "fine boring" techniques** are now universally accepted by progressive firms. By running the cutting tool at its maximum cutting speed, time is saved, and accuracy and finish greatly improved. Hitherto such machines were limited to light cuts and fixed centre heights: this is no longer so. The Milnes Heavy duty boring machine has overcome these limitations, and has extended the application to a wide range of general engineering components either as one offs or batches of thousands. The machine is capable of roughing castings with cuts up to ¼in. deep, and spacing accurately any number of bores. It is robust, dependable and easy to operate, and can be profitably employed in all modern machine shops.




ACCURACY plus FINISH



devised and produced by

**Henry Milnes Ltd.,**

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TELEPHONE : BRADFORD 41301

*EST. 1858*

OA/6360A

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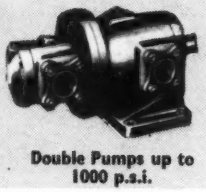
## Hydraulic Equipment for

*The illustrations show only a few representative Hydraulic Components that are manufactured in Britain by STEIN ATKINSON VICKERS*

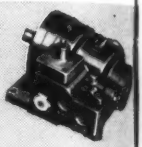
**BALANCED VANE TYPE PUMPS**

Single stage up to 1000 p.s.i.

Two stage up to 2000 p.s.i.



Double Pumps up to 1000 p.s.i.



Combination Pumps up 1000 p.s.i.

**PRESSURE CONTROL VALVES**

Relief Valve. Balanced Piston Type

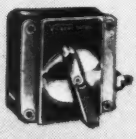
Reducing Valve

Sequence Valve

Unloading Relief Valv

**FLOW CONTROLS**

Flow Control Valve



Flow Control and Overload Relief Valve

Flow Control and Check Valve

Pressure Switch

**MOTORS AND CYLINDERS**

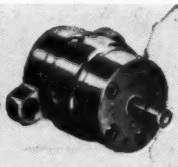
Balanced Vane Motor

Cylinder (Eye Mounting)

Cylinder (Foot Mounting)

Cylinder (Flange Mount

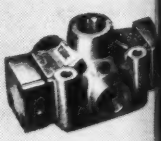
**DIRECTIONAL CONTROL VALVES**



Rotary Pilot Valve

Plunger Type 4-way Valve

Lever operated 4-way Valve



Pilot operated 4-way Valve

**STEIN ATKINSON VICKERS HYDRAULICS Ltd**

197 KNIGHTSBRIDGE, LONDON, S.W.7. Telephone: KNightsbridge 9641

SAS 21

# RANGE of for Machine Tools

The majority of leading British Machine Tool Manufacturers specify VICKERS Hydraulic Systems.

STEIN ATKINSON VICKERS — manufacturers in Britain of the world-famous range of VICKERS Hydraulic Equipment — have more experience in the application and design of complete hydraulic systems for the operation and control of Machine Tools than any other organisation.

This fund of knowledge, backed by VICKERS technical and spares facilities in 17 countries ensures real service for the machines that you export.

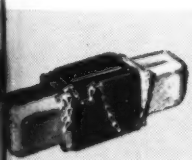
### *Circuit Design Service*

STEIN ATKINSON VICKERS provide free technical advice and circuit design services. Installations can be planned in the closest co-operation with your technicians.

### *Stein Atkinson Vickers Hydraulics Schools*

Fortnightly two-day courses are held for your design and maintenance personnel. There are three courses available:

1. *Introductory technical course for designers, draughtsmen and others wishing to acquire a basic knowledge of Hydraulics.*
2. *Advanced Technical Course.*
3. *Service Course for maintenance engineers.*



Solenoid operated 2 & 4-way Valve

Solenoid controlled, Pilot operated 4-way Valve

**SOME OF THE LEADING MACHINE TOOL MANUFACTURERS WHO SPECIFY VICKERS HYDRAULIC EQUIPMENT**

Archdale
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David Brown
B.S.A.
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Centec
Churchill Gear Machines
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Cincinnati
Coventry Gauge & Tool
Craven
C.V.A.
Delapena
Drummond
Ex-Cell-O
Funditor
Gear Grinding Co.
Giddings & Lewis-Fraser
Hayes
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Herbert
High Precision Equipment
Hi-Ton
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## . . . for RELIABLE hydraulics

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# another Kearns development for improved production efficiency...

# MODEL 451P

## horizontal, surfacing, boring, drilling, tapping *and milling machine*

Following specialized research and design in the manufacture of over 5,000 horizontal boring machines, this latest addition to the Kearns range incorporates all the benefits derived by concentrating on one type of machine—providing versatility, accuracy and efficiency.

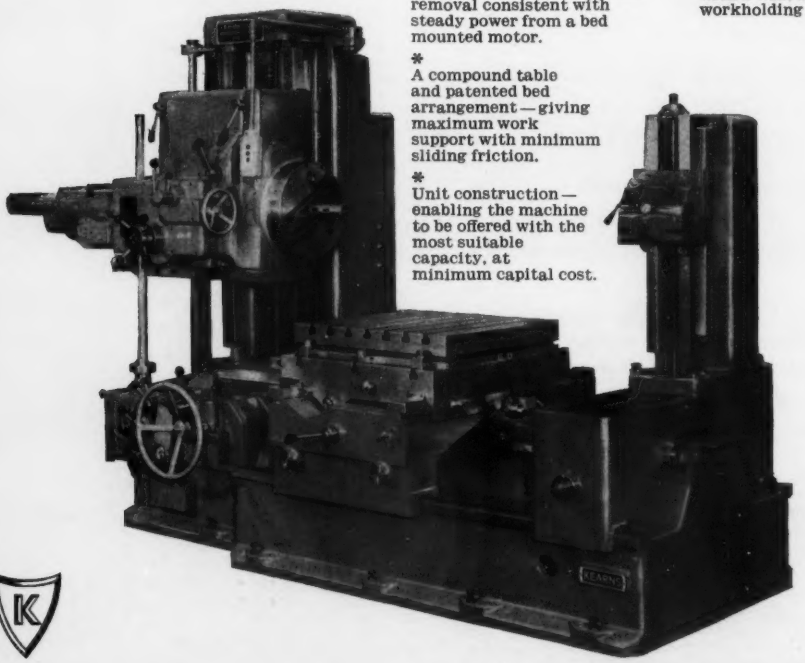
*Important features include...*

* The combination of a travelling spindle with a patented automatic built-in facing chuck.
* Our famous cushioned drive — providing effortless metal removal consistent with steady power from a bed mounted motor.
* A compound table and patented bed arrangement — giving maximum work support with minimum sliding friction.
* Unit construction — enabling the machine to be offered with the most suitable capacity, at minimum capital cost.

*Typical Specification*

| | |
|---|---|
| Spindle dia. | 3" |
| Max. facing capacity | 24" |
| H.P. | 7½. |
| Speed range | 6-750, 1000 or 1160. |

These machines are available with a wide range of workholding capacities.



# MODEL 451P—versatility with accuracy

**H. W. KEARNS & CO LIMITED BROADHEATH near MANCHESTER**

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## – from any point of view

**There are sound reasons for using "Super Capital" High Speed Steel Toolbits. The high quality steel is production controlled and tested, in Balfour's own works, from the melt to the finished product. Toolbits are subjected to a specialised heat treatment to ensure extra life and durability. They satisfy the needs of users who require maximum performance at no extra cost. These qualities ensure that a change to "Super Capital" is a change for the best.** *Available in Sheffield, and also from branch office stocks in London, Birmingham, Manchester, Cardiff and Glasgow.*

**ARTHUR BALFOUR**

**ARTHUR BALFOUR & CO, LTD. CAPITAL STEEL WORKS, SHEFFIELD ENGLAND.**

*Manufacturers of High Quality Tools*

**FOR OVER A CENTURY**

**GEO. WALKER & SONS**

**(BIRMINGHAM) LTD.**

**WARWICK RD. TYSELEY, BIRMINGHAM, 11**

PLAIN HELICAL · CONCAVE · CONVEX · SIDE & FACE CUTTERS · END & FACE MILLS · SLOT DRILLS · ETC · ETC

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Mechanical tubing
does you a good turn...
...there are numerous occasions when the use of mechanical tubing can make substantial savings to your labour, time and material costs. If you are engaged in machine shop work, the manufacture of rollers, or round shaped articles, mechanical tubing can help you. We also have available the full range of pressure tubing.....
A comprehensive booklet giving details of our considerable stocks of tubing in various sizes and finishes will prove invaluable to you.
Do yourself a good turn by writing for this booklet NOW!
Also consult us for... ... ducting ... storage tanks ... mild steel fabrications etc.
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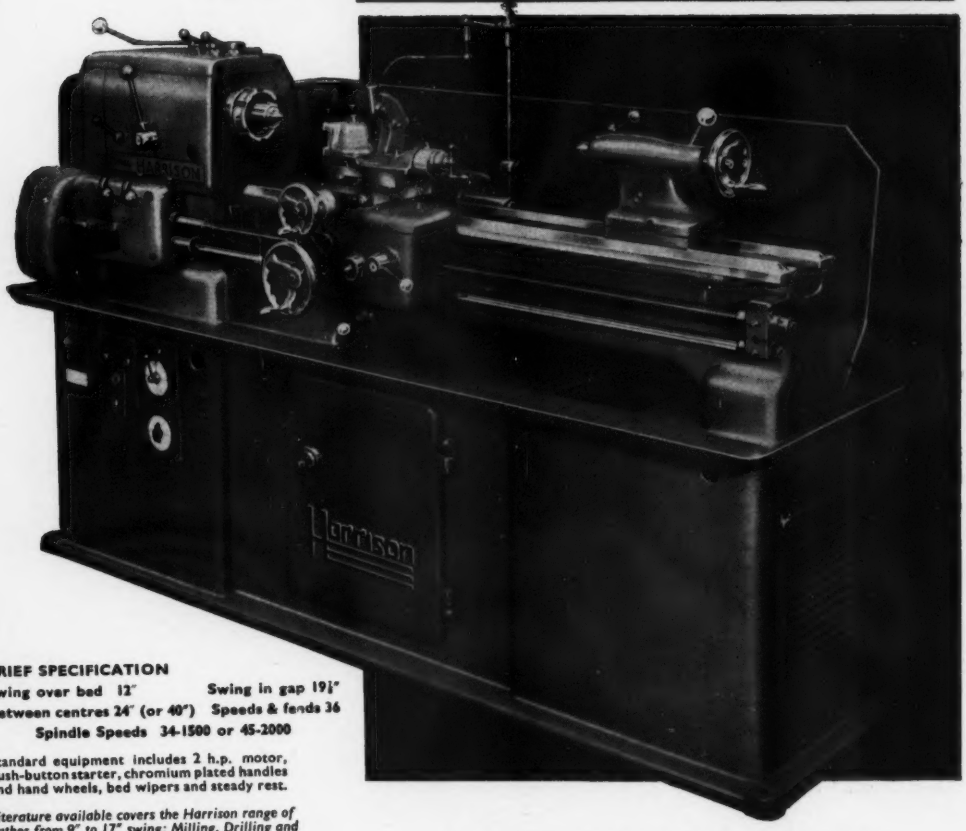
# Harrison

## 12" SWING LATHE

Increased centre height and swing
Hardened and ground bed of wide heavy section
New design clutch and brake
Built-in motor and suds tank
More horse power
Higher speeds

**offers you greater production than you would believe possible at the price**




**BRIEF SPECIFICATION**

**Swing over bed 12" Swing in gap 19½"**
**Between centres 24" (or 40") Speeds & feeds 36**
**Spindle Speeds 34-1500 or 45-2000**

Standard equipment includes 2 h.p. motor, push-button starter, chromium plated handles and hand wheels, bed wipers and steady rest.

*Literature available covers the Harrison range of Lathes from 9" to 17" swing; Milling, Drilling and Grinding Machines and Engineers' Accessories.*

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PL

SIZES FROM $\frac{1}{16}$in. TO 1$\frac{3}{4}$in. DIAMETER SUPPLIED TO LIMITS OF ±0·00025in. SIZES ABOVE 1$\frac{3}{4}$in. TO 3in. DIAMETER SUPPLIED TO LIMITS OF ±0·0005in. LENGTHS FROM 6ft. TO 30ft. ALL WITH FLAWLESS SURFACE FINISH.

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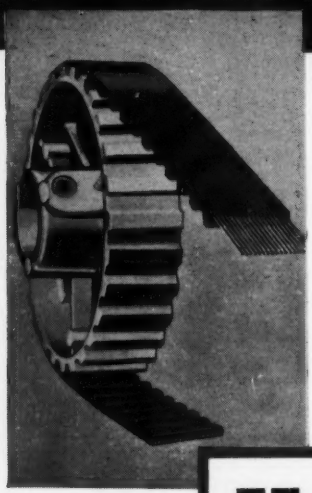
US RUBBER

# POWERGRIP

BELT DRIVES



**PowerGrip,** the belt with teeth that grip to give near 100% mechanical efficiency.

**PowerGrip,** which has unusual flexibility and lightness, yet greater pulling power.

**PowerGrip,** for better performance and economy — without lubrication.

**PowerGrip,** for speed ratios as high as 12 to 1. Like to know more? Ask our Technical Dept.

K

**Wm KENYON & SONS LTD**

*DUKINFIELD · CHESHIRE*

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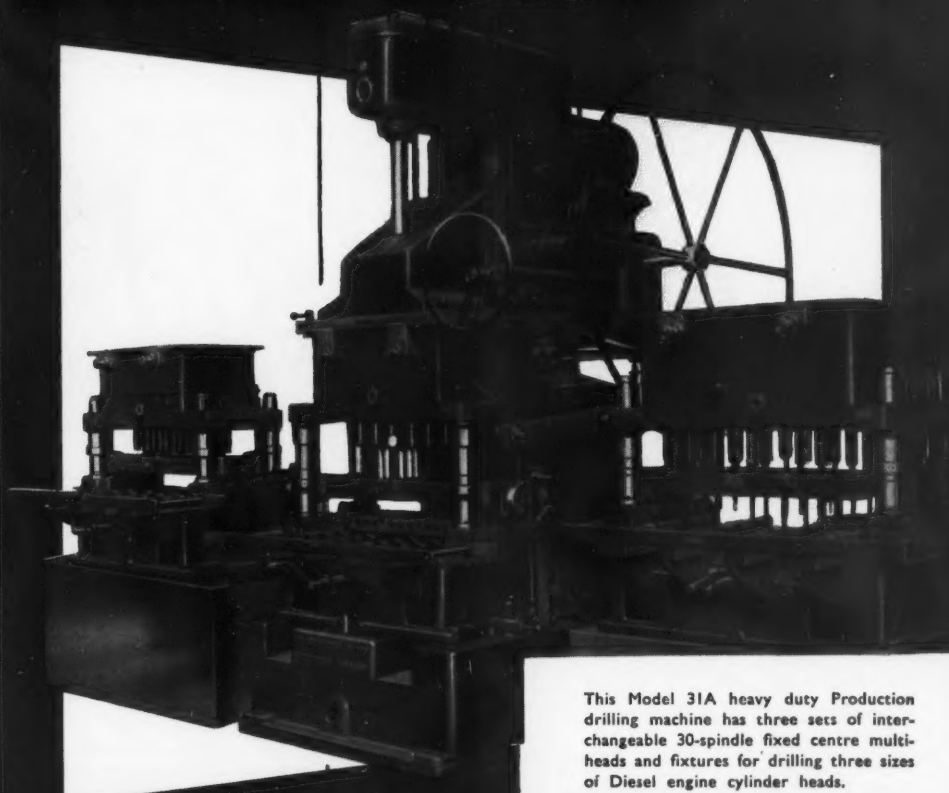
# CORONA

high speed—
heavy duty

## PRODUCTION DRILLING

on diesel engine cylinder heads at—F. Perkins Ltd., Peterborough



This Model 31A heavy duty Production drilling machine has three sets of interchangeable 30-spindle fixed centre multi-heads and fixtures for drilling three sizes of Diesel engine cylinder heads.

Eight similar sets are in operation at F. Perkins Ltd., Peterborough. Outstanding amongst the many features of this equipment is great stability, and accuracy of re-location with quick changeovers.

Complete changeover in nine minutes.

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TELEPHONE: LEICESTER 67534 (5 LINES)
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SCOTLAND: W. S. LANG & CO., 48 OSWALD STREET, GLASGOW, C.1. TEL: CENTRAL 2539

**WE COINED A NEW WORD**—not just to twist your tongue but to describe a new component for even better control units. Square D design leadership now brings you illuminated push-button control. Complete with built-in pilot-light, this control button will save you mounting space and mounting time.

May we introduce Alec Trician—illuminated above—the knowledgeable electrical chap? You'll be seeing him again, pointing out the wisest choice in electrical control gear.

**For extra efficiency and safety be sure to specify Square D oil-tight control units.**

- **Full heavy-duty contact rating.**
- **Positive pressure connections.**
- **Clearly marked terminals for easy wiring.**
- **Button guard available to prevent accidental operation.**
- **Full range of voltage ratings.**
- **Choice of 6 colourcaps.**
- **Same single-hole mounting as other oil-tight units.**

**Write for Product News No. 9001**

SD7

SQUARE D LIMITED

CHENEY MANOR · SWINDON · WILTSHIRE

Field Offices: LONDON · BIRMINGHAM · MANCHESTER · GLASGOW · NEWCASTLE · BRISTOL · LEEDS

*Underside view of a housing, showing the intricate machining of the hydraulic bores.*

# WE CAST THESE IN STEEL AND PRECISION MACHINED THEM

These steel castings, housings for a heavy strip mill, were part of an order for twenty, cast and precision machined at Imperial Steel Works. Finished weight of each casting 97 cwt.: total machining time for each housing approximately 1,000 hours.

Large castings like these, or small castings weighing a few pounds only, machined or not as required, all fall within the Edgar Allen service in steel castings for every industry, described in detail in our most informative "Steel Foundry Book"—sent on request; please use the form below.

**EDGAR ALLEN & CO. LIMITED**
**IMPERIAL STEEL WORKS · SHEFFIELD, 9**

To EDGAR ALLEN & CO. LTD. F80 My.
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*Please post the STEEL FOUNDRY BOOK to:*

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B

Forty years' experience in rebuilding machine tools enables us to handle any normal machine and also the more specialised machines such as Pratt & Witney Kellers, De Vlieg Jigmils, Fellows Gear Shapers, Heald Borematics and Internal Grinders.

# HERBERT REBUILT MACHINE TOOLS

A "Herbert Rebuilt" machine is as accurate as new and is once more an efficient unit which will continue in production for many more years.
A visit to our Rebuilding Department to see the efficient mechanical and electrical facilities available will be of interest.

A section of the department where the rebuilding is carried out on a wide range of machines.

ALFRED HERBERT LTD., COVENTRY Factored Division, Red Lane Works.

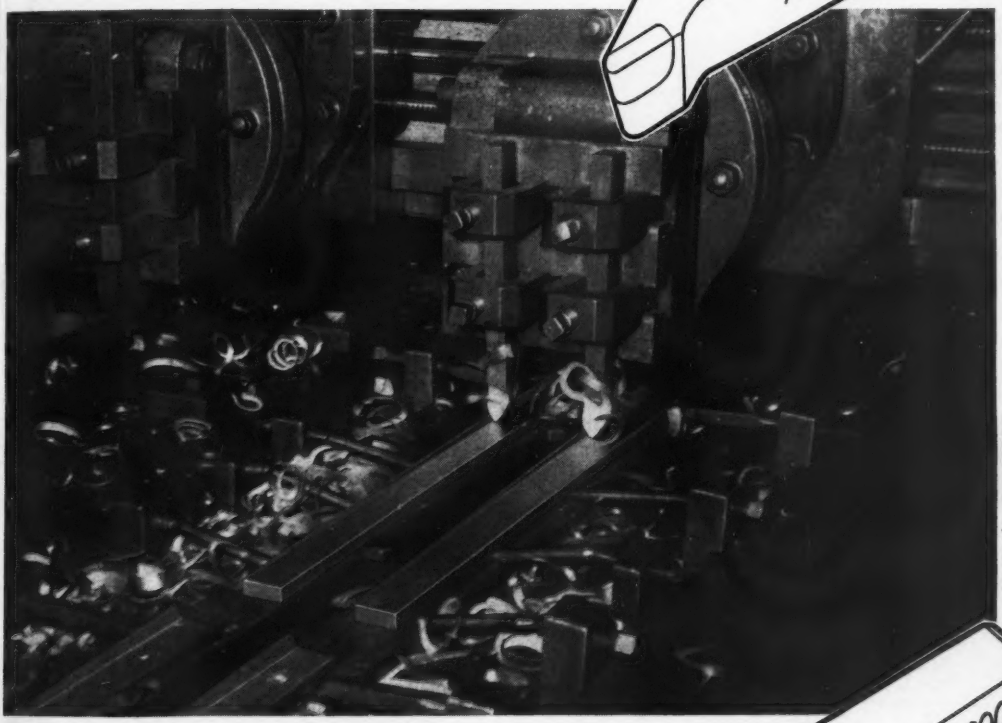
AD500

# Ardoloy

An A.E.I. Product

Ardoloy-tipped tools can be supplied for all appropriate machining operations and for those applications where resistance to wear is important.

Ten grades—each for a specific class of work.



*Ardoloy grade S 200 planing tools machining jib strips, surface speed 100 ft. per min., ¼" depth of cut, feed ·025".*

**Tools include :—**

**LATHE and PLANER TOOLS**
**FACE and OTHER TYPES OF MILLING CUTTERS**
**PRECISION ADJUSTABLE BORING TOOLS**
**THREADING TOOLS**
**TWIST DRILLS, REAMERS and COUNTERBORING TOOLS**

Loose tips supplied to enable customers to tip their own tools

ALFRED **HERBERT** LTD., COVENTRY

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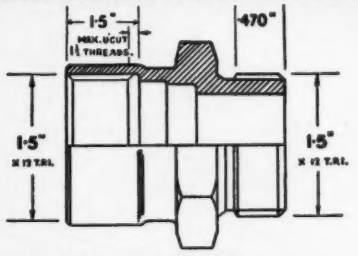
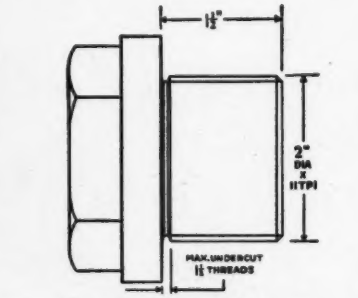
B2

# *Revolutionary* CENTRE LATHE SCREWCUTTING



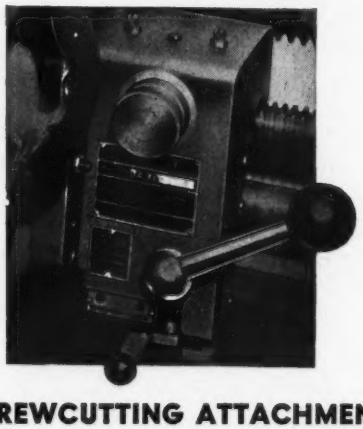

| | | | |
|---|---|---|---|
| Material | H.T.S.S. (FB1006) | Spindle R.P.M. | 477 Top speed available |
| Thread | Int. 12TPI UNF 2B Ext. 12TPI UNF 2A | Tool | Tungsten carbide |
| Cutting Time | Int. 55 Secs. Ext. 40 Secs. | Lathe | Willson 7½" |




| | | | |
|---|---|---|---|
| Material | L.A. (L65) | Spindle R.P.M. | 1278 |
| Thread | 11 T.P.I. | Tool | HSS (18% Tungsten) |
| Cutting Time | 40 Secs. | Lathe | Harrison L6 |

In the same way that the chasing dial has superseded the old method of marking chuck, headstock, leadscrew collar and bracket; the AINJEST HIGH SPEED SCREW-CUTTING ATTACHMENT has established a further major advance in screwcutting techniques. Its use on standard centre lathes allows the automatic engagement and disengagement of the leadscrew at the highest spindle speeds of which the machine is capable.

- ★ The cut cannot be started at the wrong point.
- ★ The cut is stopped accurately so that external or internal threads can be cut tight to a shoulder at high speeds.
- ★ Tungsten carbide tools can be used with great advantage.
- ★ Chasing dial is eliminated.
- ★ The attachment remains in position, ready for use without restricting the versatility of the lathe.



AINJEST *High speed* **SCREWCUTTING ATTACHMENT**

● *stockists of carbide threading tools*

Write for details and prices to Dept A.S.C.

**SAUNDERSON & COSTIN LTD · HIGHCLERE · NEWBURY · BERKS · ENGLAND · Tel.: HIGHCLERE 448**

# Schneider

## SURFACE GRINDING MACHINE

*IMMEDIATE DELIVERY FROM STOCK*

*MODEL JOH2*

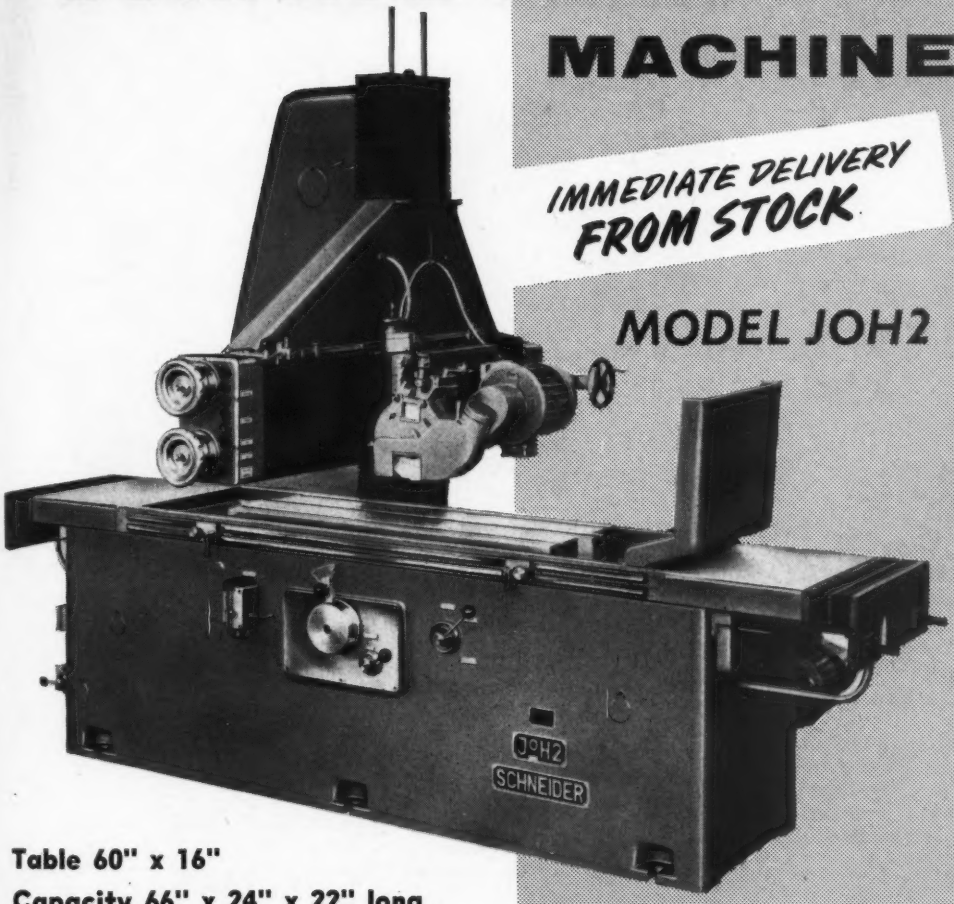



**Table 60" x 16"**

**Capacity 66" x 24" x 22" long**

**Please send for full details.**

**ELGAR**

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**MACHINE TOOL COMPANY LIMITED**

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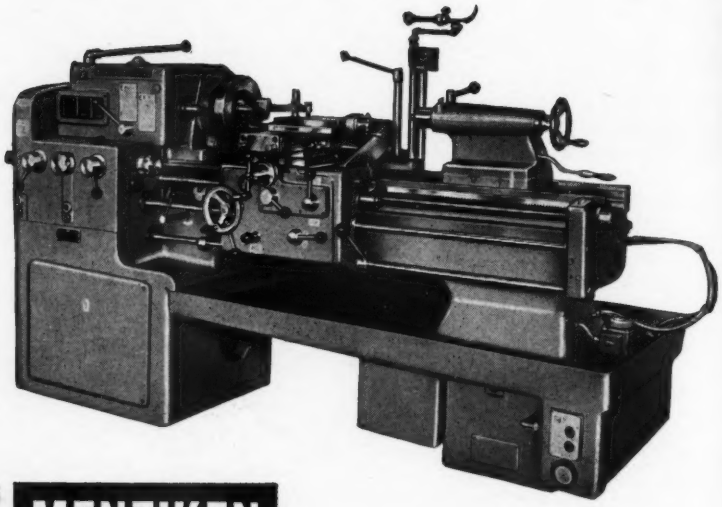
# Profile cutters copied and relieved simultaneously



SWISS **MENZIKEN**

## HYDROCOPYING RELIEVING LATHE MODEL M200

Profile turning and relieving simultaneously, the MENZIKEN M200 offers unique advantages for producing form milling cutters rapidly, accurately, economically. Setting the spiral angle can be quickly and accurately effected. Both axial and radial relieving can be performed, and copying from flat or cylindrical masters. Copying by single point tool, wide forms can be produced quickly with chatter-free finish. The relieving mechanism can be readily disconnected for normal turning. 25 English, 24 metric and 24 module screw cutting pitches are available and a wide range of equipment for special jobs.

*Centre height 8". Distance between centres 60".*
*Spindle speeds 1¼ to 1130 r.p.m. 30 Longitudinal and 30 cross feeds*

**Send for the fully illustrated brochure M/184.**
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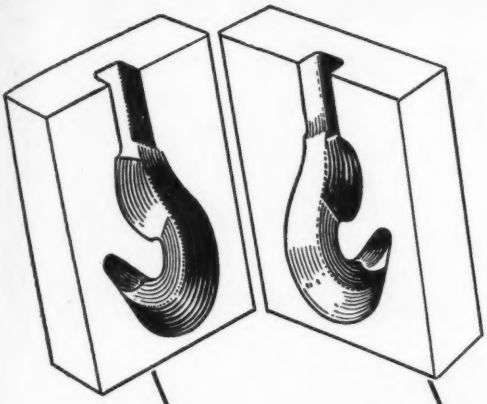
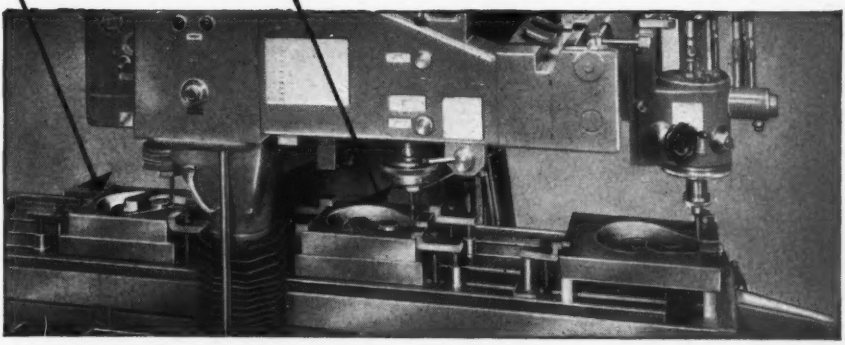


# Both halves at once



## SWISS RIGID *AUTOMATIC* HYDROCOPYING DIE-SINKING MACHINE KA 200

Reverse image attachment copy mills both left- and right-hand die halves at the same time from the same model. Copying is accurate to within .002", fully automatic and needs no supervision. 360° profiles can be produced without using a rotating table and feed is constant—*and* on vertical contours up to 90°. Light feeler pressure permits the use of wooden or plaster models.

*Standard table sizes up to 92½" × 25½". One, two, four or six spindles.*

**A two spindle machine with reverse image attachment is available for immediate delivery.**

*Write for technical brochure M/172*

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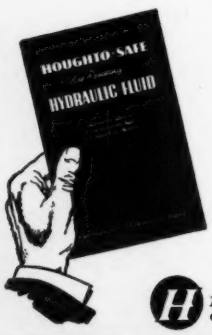
*Before you go any further..... you are about to decide whether you will continue to risk using petroleum oils in your high pressure hydraulic equipment operating near high heat, open flame or other potential fire hazard: OR.... whether you will 'be safe' and change to Houghto-Safe Fire-Resistant Hydraulic Fluid.*

# HOUGHTO-SAFE

## FIRE-RESISTANT HYDRAULIC FLUID

An informative folder on Houghto-Safe is available on request . . . . on your business heading, please.

**Applications: Pressure Die Casting Machines, Hydraulic Regulators and Controls, Furnace Door Mechanisms, Heavy Foundry Equipment, Clamping Fixtures on Automatic Welders and any other equipment employing hydraulic oils in face of a potential fire hazard.**

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MATRIX QUALITY

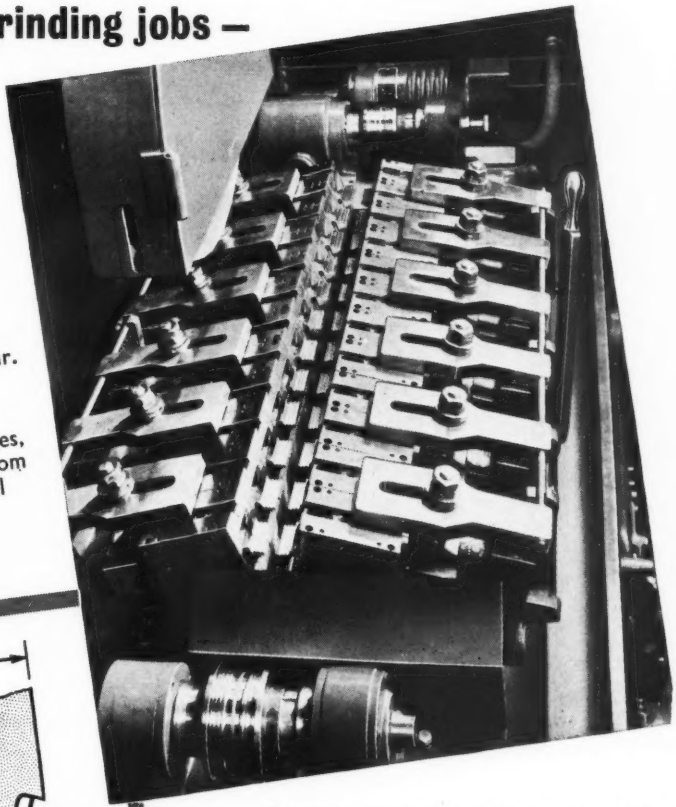
*British Built*

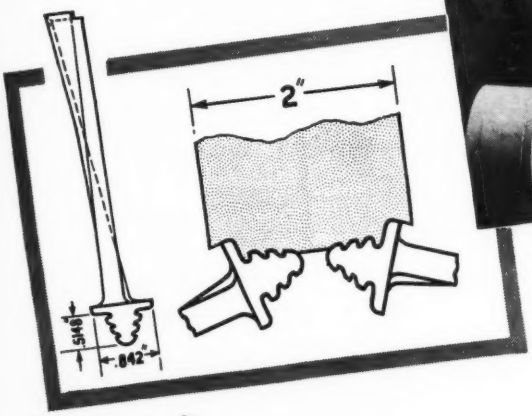
# THOMPSON

## TRUFORMING GRINDERS

## save time on form grinding jobs —

PART NAME: Jet Engine Blade.
METHOD OF HOLDING: 24 Place Fixture.
METHOD OF GRINDING: "Truforming" Two Rows (12 per row) from Solid — ·100 in. Stock Removal per Side.
MACHINE SIZE: Type "C" 12 x 16 x 44 Truform Grinder.
PRODUCTION: 33 pieces per hour.
NUMBER OF PIECES PER WHEEL DRESSING: 96.
CRUSHER ROLL LIFE: 864 pieces, before regrinding Work Roll from Reference Roll to restore initial accuracy.






Thompson Truforming is an accurate and fast method of producing identical parts by transferring the shape or form of a preformed crushing roll first to the grinding wheel and then to the work. The crushing process produces a very free cutting wheel which gives an exceptionally high rate of stock removal.

It has many time-saving and product-improving applications, including the elimination of difficulties encountered in maintaining tolerances as grinding is carried out after hardening.

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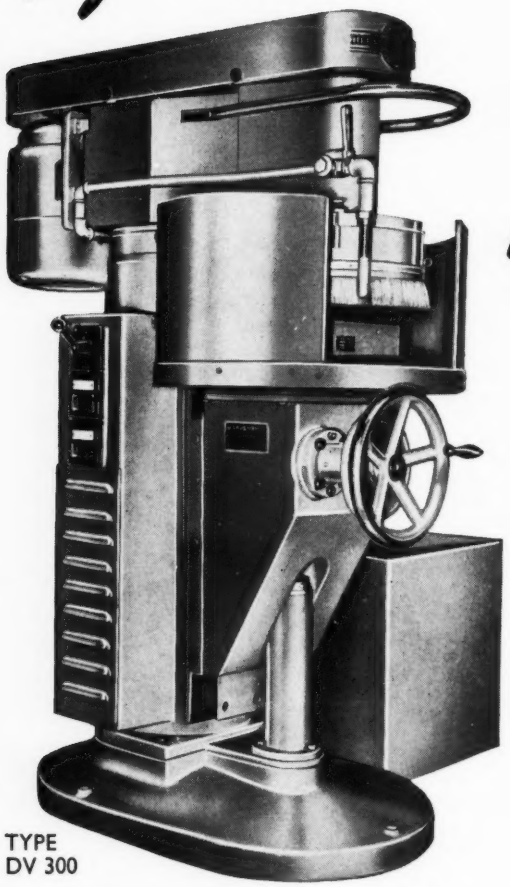
# *High Speed* STOCK REMOVAL

# DISKUS

## SWIVEL HEAD SURFACE GRINDER



TYPE
DV 300

***ENTIRE WORKPIECE SURFACE GROUND IN ONE WORKPASS***

The superior stock removal capacity of the segmental grinding wheel shortens grinding time to a fraction of that taken by peripheral grinding owing to the small area of contact with the workpiece.

ONE TRAVERSE WITH DISKUS GRINDER

MANY TRAVERSES WITH PERIPHERAL GRINDING

Balanced swivel arm, mounted on heavy duty anti-friction bearings fitted to amply dimensioned column, ensures smooth and easy movement.

**BRIEF SPECIFICATION—TYPE DV 300**

Diameter of Segmental grinding wheel 12"
Chucking surface of work table 16" x 8"
Vertical adjustment handwheel graduated in ·0002"

## Low Cost—Early Delivery

*This machine is only one of the many different models of the standard and special segmental wheel grinders made by the Diskus Company.*

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DV 300

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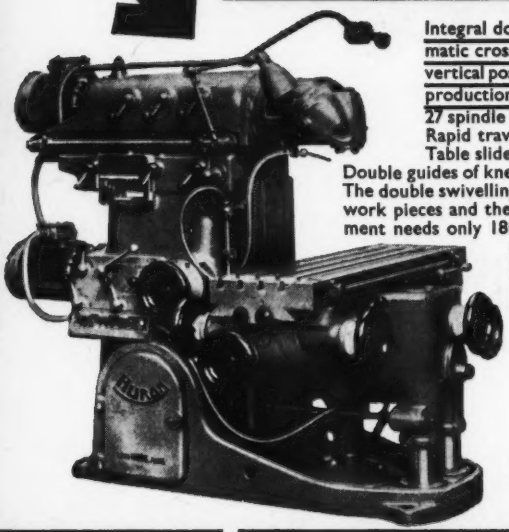
SLIDING RAM GIVES 27½in. AUTO CROSS FEED

# HEAVY DUTY MILLING

ANGULAR · COMPOUND · HORIZONTAL · VERTICAL

# HURON SUPER UNIVERSAL MILLERS



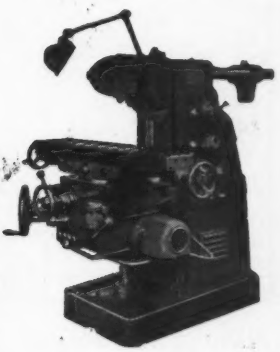
Integral double swivelling universal head provided with 27½in. automatic cross feed by the sliding ram, can be set to the horizontal or vertical position, or to any angle instantaneously—permits the heaviest production cuts. Head can be retracted completely from table line. 27 spindle speeds from 30 to 2,066 r.p.m., 27 feeds from ⅛in. to 30in. Rapid traverses in all directions. All operating controls duplicated. Table slides directly in the knee without cross movement or swivel. Double guides of knee permit components in excess of 1½ tons to be machined. The double swivelling universal head requires an opening of only 14in. to enter work pieces and the whole sliding ram with its 27½in. automatic cross movement needs only 18in. clearance. OPTIONAL EXTRA FEATURES: Mounted spacing casting assemblies providing additional 8in. capacity under spindle. 26in. wide 8 T-slot tables and 39½in. automatic cross feed of sliding ram with special heavy duty knee and front operating position.

| Type | Table | Automatic Feeds Long | Cross | Vert. |
|---|---|---|---|---|
| KU4 | 56⅛in. × 15¾in. | 43½in. | 27½in. | 19½in. |
| KU5 | 64⅛in. × 15¾in. | 51½in. | 27½in. | 19½in. |
| KU6 | 78⅛in. × 16½in. | 59in. | 27½in. | 19½in. |
| KU55 | 64⅛in. × 26in. | 51½in. | 39½in. | 18⅛in. |
| L83 | 157in. × 59in. | 118in. | 39½in. | 59in. |

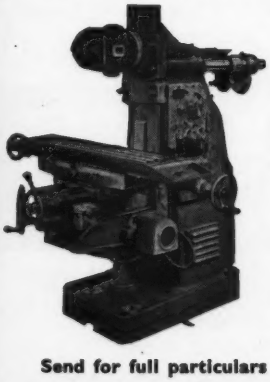
**Type 'L' Open-side Traversing Head Universal Miller** will mill, bore, slot and drill the largest work-pieces at one setting. The unique design permits greatest variety of operation on large work-pieces; the component remains stationary on the large work-table. Upright slides full length of base table and the sliding ram moves vertically and horizontally.

# DUFOUR UNIVERSAL MILLERS

*WITH DOUBLE UNIVERSAL SWIVELLING HEAD. RETRACTABLE SLIDE BRACKET AND SPACING CASTING GIVING 26" DAYLIGHT ON No. 59 AND 21" ON No. 61*



FOR ALL MODELS Direct reading dial change for speeds and feeds. All parts subject to wear hardened and ground and completely interchangeable. Built to closest tolerances. Rapid traverses in all directions. Table swivels 30°. No. 40 taper for main horizontal spindle, double swivelling universal head, dividing head and rotary table. Hardened and ground centre guide for slideways. Twin overarms. Double swivelling sliding spindle heads with speeds 53-3000 r.p.m Double swivelling universal head on retractable slide bracket providing with 5½in. Spacing Casting Drive assembly on 59 Machine 26in. daylight, and 21in. on No. 61.



MODELS 53 & 61. 16 universal head spindle speeds 21-1600 r.p.m.; 8 horizontal spindle speeds 21-1180 r.p.m.; 8 automatic feeds ½-18½in.

MODEL 59. 36 universal head spindle speeds 14-1780 r.p.m.; 12 horizontal spindle speeds 21-1180 r.p.m.; 16 automatic feeds ½-20in.

MODEL 54. Automatic cross feed of universal head 20in.; 18 universal head spindle speeds 12-1500 r.p.m.; 36 horizontal spindle speeds 6-1500 r.p.m.; 18 automatic feeds ¼-23½in.

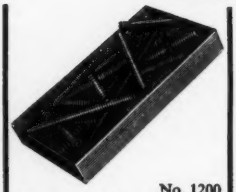
| Type | Table | Automatic Feeds Long. | Cross | Vert. |
|---|---|---|---|---|
| 53 | 43½in. × 9½in. | 27½in. | 9½in. | 15½in. |
| 61 | 47½in. × 10½in. | 30½in. | 9½in. | 15½in. |
| 59 | 51⅛in. × 11½in. | 34½in. | 11⅛in. | 21⅛in. |
| 54 | 67in. × 14½in. | 43½in. | 14½in. | 20½in. |

**Send for full particulars of our very extensive range of these machines; ask for demonstration.**

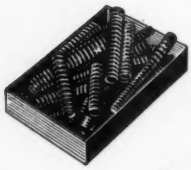
**Rudolph Carne & Co. Ltd.** SWAN WORKS, FISHERS LANE, CHISWICK, LONDON, W.4.

Telephone: CHISWICK 0514 & 6585. Inland Telegrams: RUDCAR, CHISK, LONDON. Overseas Telegrams: RUDCAR, LONDON.

# EXPERIMENTAL SPRINGS?

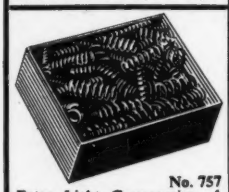


**No. 1200**
Three dozen Assorted Light Expansion Springs, suitable for carburettor control, etc. 15/-.

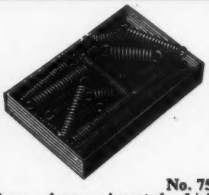


**No. 760**
Three dozen Assorted Light Compression Springs. 1" to 4" long, 22 to 18 S.W.G., ¼" to ½" diam. 7/6.

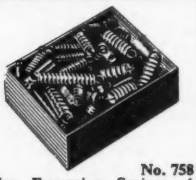
**No. 98A**
Three dozen Assorted 1" to 4" long, ¼" to ⅜" diam., 19G to 15G. 6/6.



**No. 757**
Extra Light Compression, 1 gross Assorted, ¼" to 7/16" diam., ¼" to 2¼" long, 27 to 19 S.W.G. 18/-.



**No. 753**
Three dozen Assorted Light Expansion ¼" to ½" diam., 2" to 6" long, 22 to 18 S.W.G. 12/-.



**No. 758**
Fine Expansion Springs. 1 gross Assorted ¼" to ⅜" diam., ¼" to 2" long, 27 to 20 S.W.G. 18/-.

That spring you want . . . in a hurry . . . where is it? Pick what you want, when you want it, from TERRY'S BOXES OF ASSORTED SPRINGS —our fine range of small boxed assortments of experimental springs. We can show you only a few from the range here. Send a postcard for our full list—and if ever you're stuck with a spring problem send it along to our Research Department—they'll gladly help you out.

**Have you a Presswork problem?**

If so, the help of our Design Staff is yours for the asking.

# TERRY'S *for SPRINGS*

**Really interested in Springs?** "Spring Design and Calculations" 10th Edition tells all—post free 12/6.

**Cut Production Costs with Terry's Wire CLIPS.** We can supply immediately from stock — from ¼" to ⅝".

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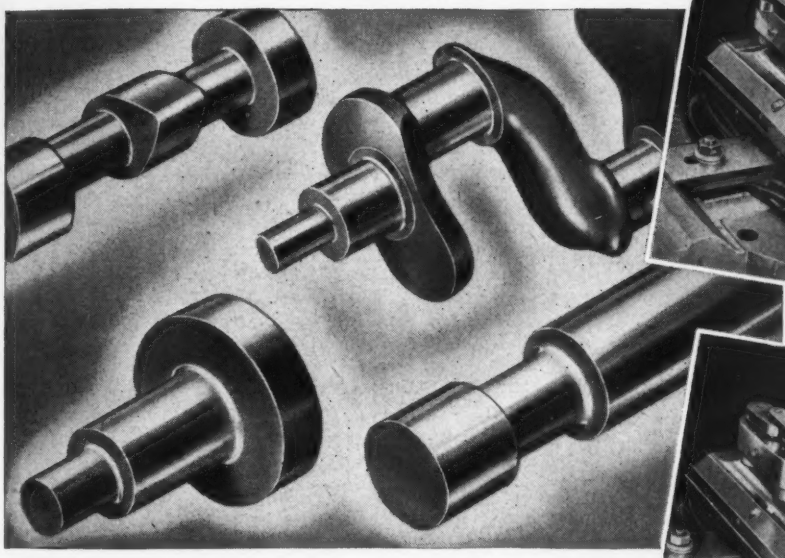
**HERBERT TERRY & SONS LTD.**
**Redditch, Worcs.**

*(Makers of Quality Springs, Wireforms and Presswork for over 100 years.)* HT31C

# Fillet Radii & Face of GRINDING Wheels

## —dressed in *ONE* continuous operation!



*Dressing the radius of Grinding Wheel.*

*Continuing across the periphery of Grinding Wheel.*

**Ensure True Contour and Perfect Blend with the**

# 'HABIT' TALLY-FORM

Wheels used for grinding components with single or double fillet radii must be dressed so that the point where the radius blends into the parallel portion of the shaft should be a true tangent, indispensible for Crankshafts, Stub axles, necked bolts, etc., etc. The Habit Tally-form provides a dressing fixture which, in **one pass** will dress the radius, continue across the wheel periphery and, if necessary, dress a second radius on the opposite side. Absolutely perfect dressing is thereby obtained.

**NO LIMIT TO WHEEL DIAMETER**

**SMALL OVERALL DIMENSIONS**

**FULLY DUST-PROOFED**

**SIMPLE SETTING & OPERATION**

*Look for the Little Flag!*

## HABIT DIAMOND TOOLING LTD

**LURGAN AVENUE, LONDON, W.6. : Telephone: FULHAM 7944 : Telegrams: HABIT, LONDON, W.6.**

# all threads

The range in both Brass and Steel is from 0.BA to 5 BA and $\frac{1}{4}$" to $\frac{1}{8}$" diameter and between $\frac{3}{4}$" and 4" long. Recommended for use within this range, with rolled threads, where studding in these lengths in cut threads would be too expensive. Please send for stock lists.

Let ORMOND quote for all Repetition Parts—for single and multi-spindle automatics up to $1\frac{1}{4}$" diameter; Brass, Steel and Light Alloy Screws in Rolled and Cut Threads, Grub-screws, Nuts, Hexagonal Bolts and Set-screws, turned from bar and Cold Headed Grades " A," " B " and High Tensile.

ORMOND ENGINEERING COMPANY LTD

**The ORMOND ENGINEERING CO. LIMITED**

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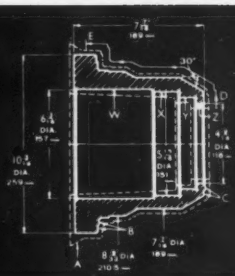
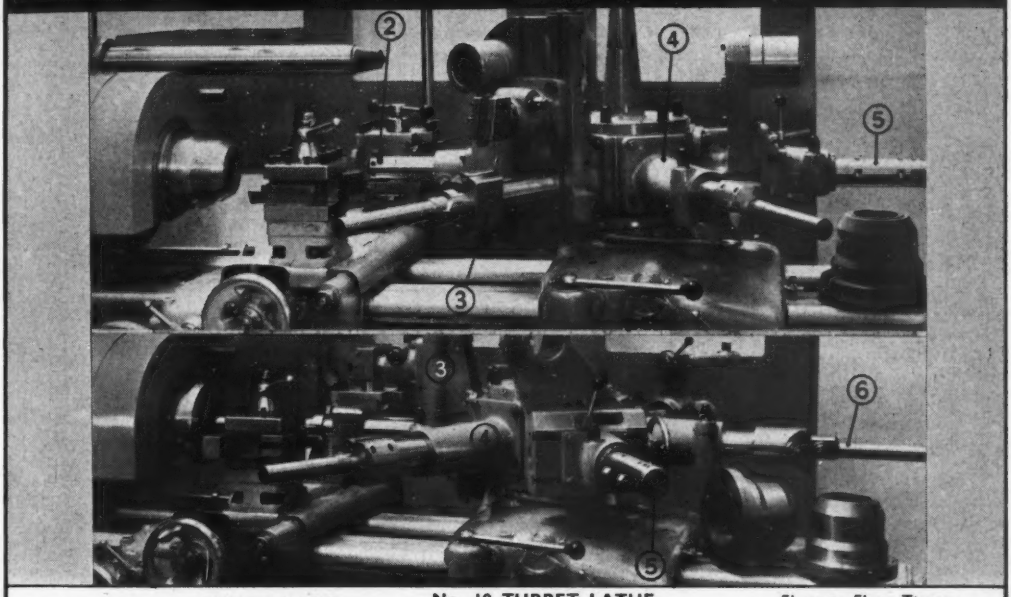
# Ward SPECIAL

## TOOLING LAYOUT No. 18






**CAST IRON**
Machined all over.

**PULLEY SLEEVE**
Tungsten Carbide Cutting Tools.

**No. 10 TURRET LATHE**
Code Word : **Covhynant**
Equipped with Hydraulic Copy Turning Attachment and 18" — 3-Jaw Tudor Chuck.

**Floor to Floor Times :**
**1st Process 15 mins.**
**2nd Process 15 mins.**

| DESCRIPTION OF OPERATION | Tool Position | | Spindle Speed R.P.M. | Max. Cutting Speed | | Feed | |
|---|---|---|---|---|---|---|---|
| | Hex. Turret | Cross-slide | | Feet per min. | Metres per min. | Cuts per inch | m/m. per rev. |
| **1st Process** | | | | | | | |
| 1. Grip on "A" in 3-Jaw chuck using loading attachment. | 1 | — | — | — | — | — | — |
| 2. Rough bore "Z" | 2 | — | 125 | 149 | 45·4 | 124 | ·205 |
| Rough double face "B" & "C" | ↔ | S.T. | 125 | 344 | 105 | 124 | ·205 |
| 3. Copy turn "D" to "E" | | | | | | | |
| 1st cut — Roughing | — | Rear | 125 | 344 | 105 | 64 | ·397 |
| 2nd cut — Finishing | — | Rear | 240 | 64* | 203 | 124 | ·205 |
| 4. Remove from chuck using unloading attachment | 1 | — | — | — | — | — | — |
| **2nd Process** | | | | | | | |
| 1. Grip on $7\frac{7}{16}$" dia. in 3-Jaw chuck | ↔ | — | — | — | — | — | — |
| 2. Rough face end (two cuts) | — | S.T. | 125 | 368 | 112 | 64 | ·397 |
| 3. Rough turn $10\frac{3}{16}$" dia. (two cuts) | — | S.T. | 125 | 344 | 105 | 64 | ·397 |
| 4. Rough bore "Z" & "W" dias. and knee turn $10\frac{3}{16}$" dia. | 3 | — | 155 | 413 | 126 | 64 | ·397 |
| 5. Rough bore "Y" & "X" dias. | 4 | — | 155 | 241 | 73·4 | 64 | ·397 |
| 6. Undercut and chamfer bores | 5 | — | 125 | 207 | 63 | Hand | Hand |
| 7. Microbore "Y," "X" & "W" dias. | 6 | — | 240 | 389 | 118·5 | 88 | ·289 |
| 8. Remove from chuck | — | — | — | — | — | — | — |

**'PRELECTOR' Combination Turret Lathes with Preselective speed-changing.**

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*fully automatic table cycle*

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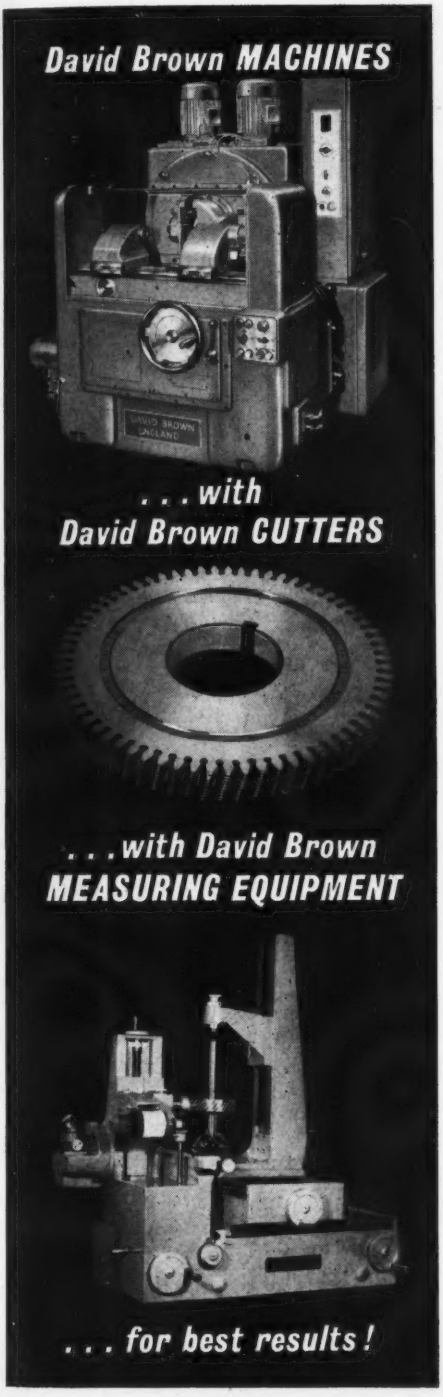


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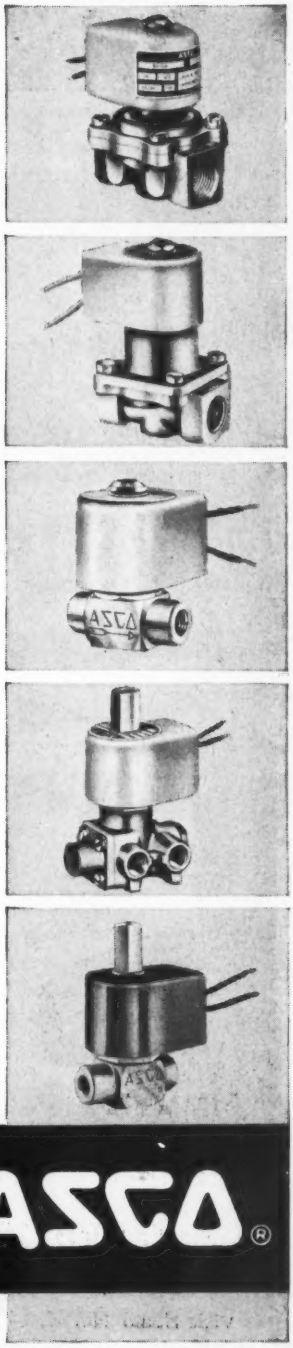

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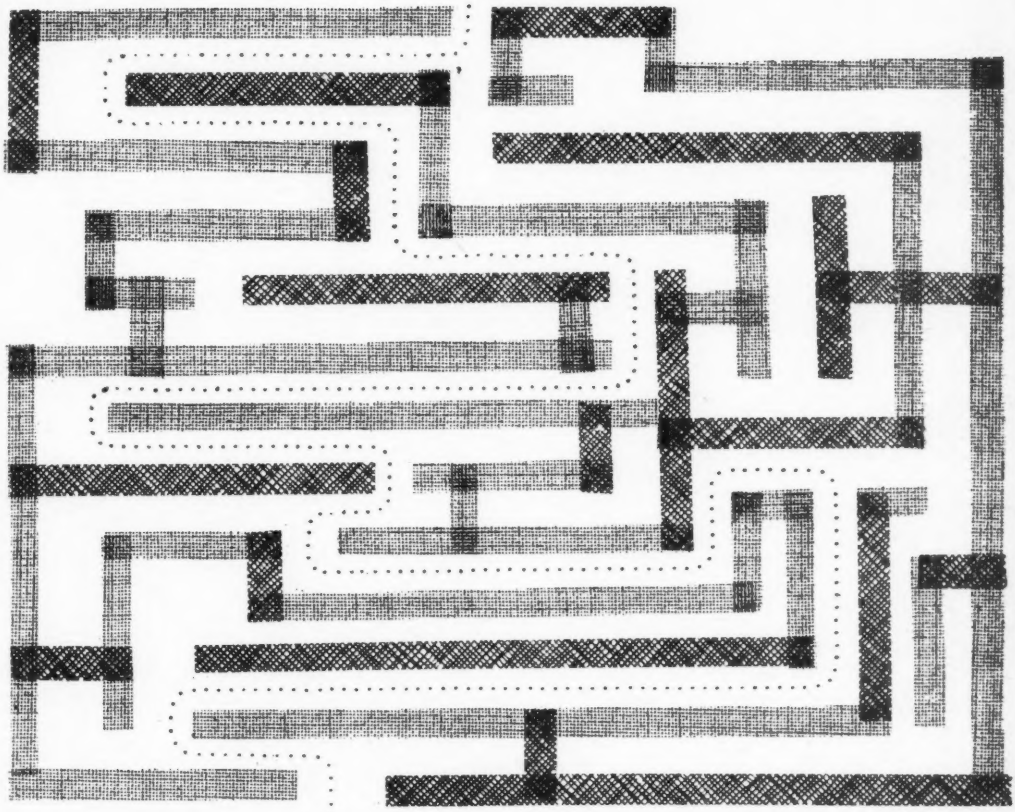

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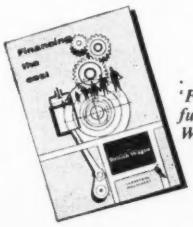


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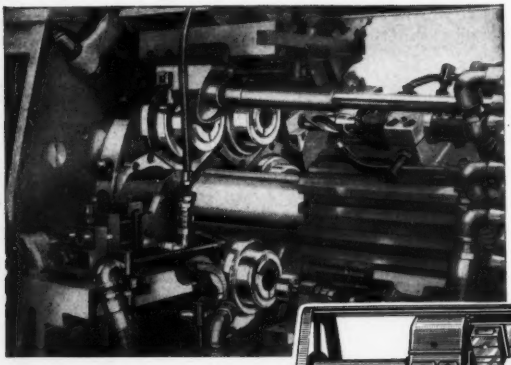

*Tooling for the subject component showing the thread-rolling box (position 2) and the polygon box for generating the flats (position 3)*

# B·S·A

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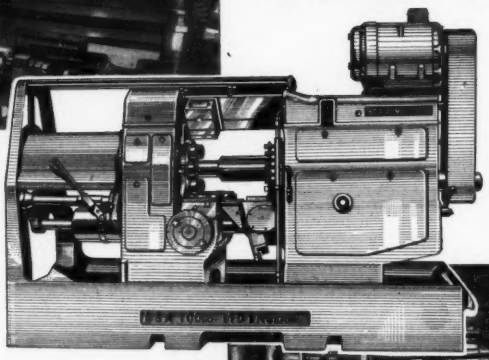
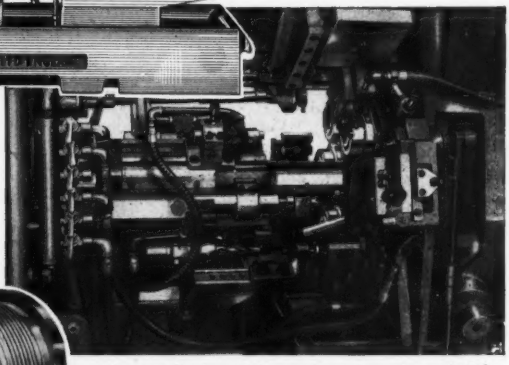
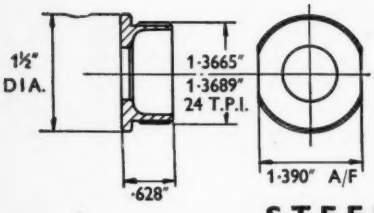
# 4
# 6
# 8 SPINDLE
## automatics

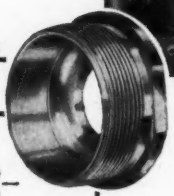




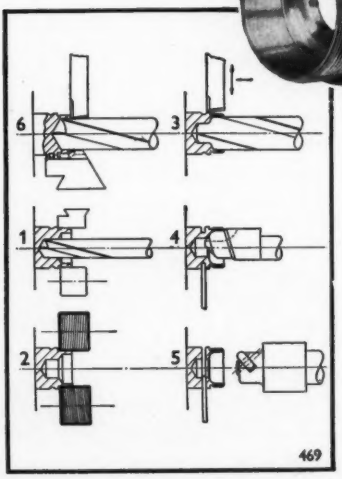
*Showing the burnishing tool on the main tool slide at position 5.*




**STEEL**



**16·25 SECS**




**6:** feed stock, form, undercut thread dia., rough O.D., rough bore, face to length.

**1:** rough drill, finish turn thread diameter.

**2:** roll thread.

**3:** generate flats, semi-finish bores.

**4:** bore, finish-machine ball track, breakdown for part-off.

**5:** burnish ball track, part-off.

Spindles speed: 471 r.p.m.
Cutting speed: 184 f.p.m.

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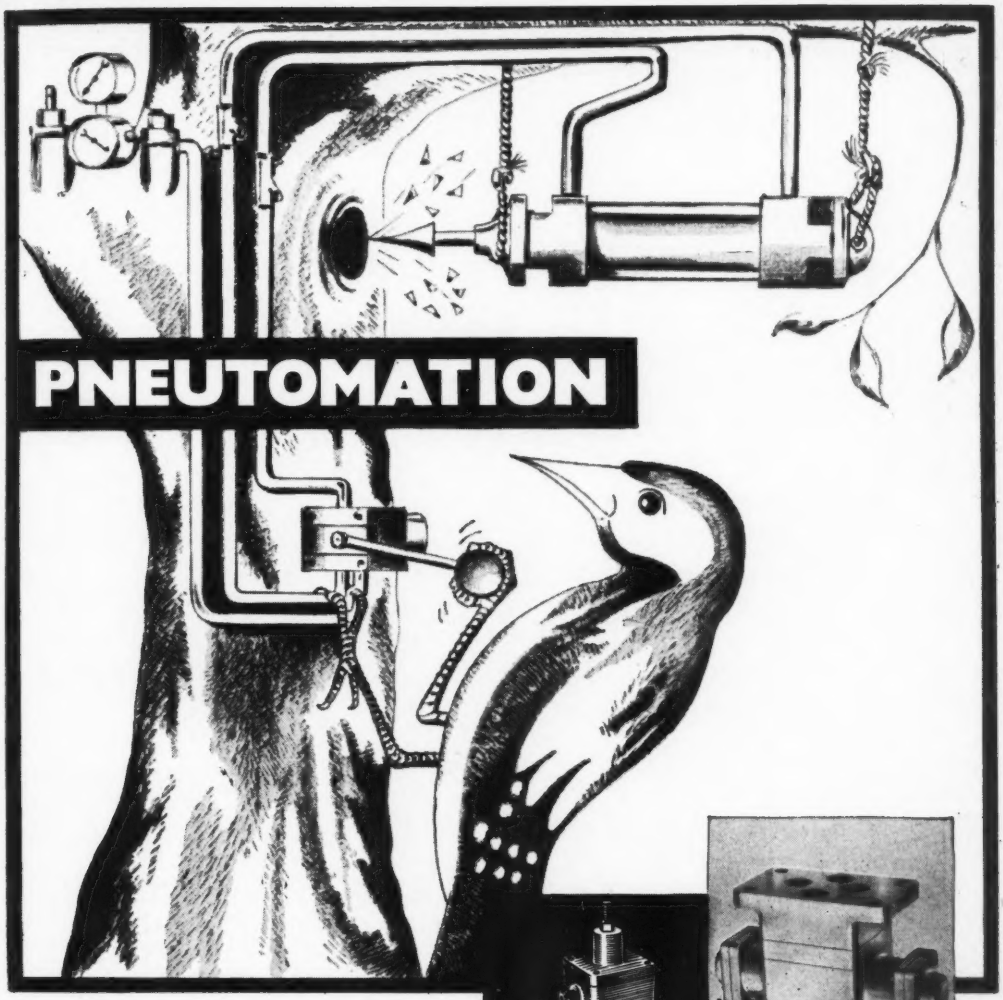


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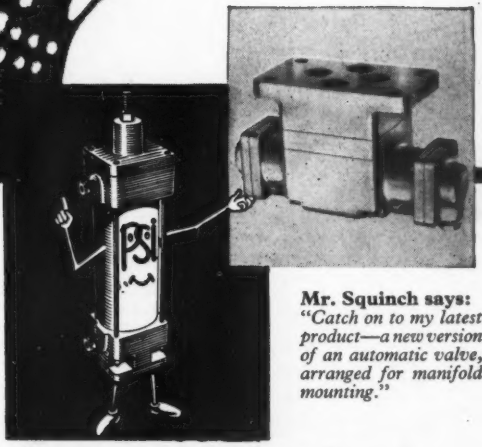

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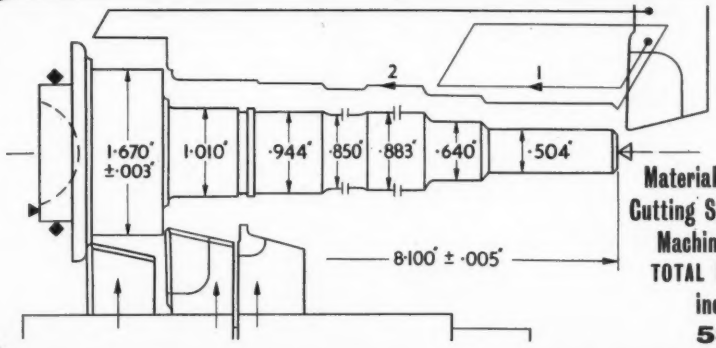


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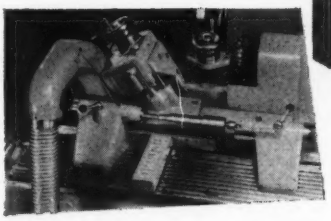
**Material—EN 18c Forging**
**Cutting Speed—850 f.p.m.**
**Machine Time—50 secs.**
**TOTAL PRODUCTION TIME including loading 58 Seconds**

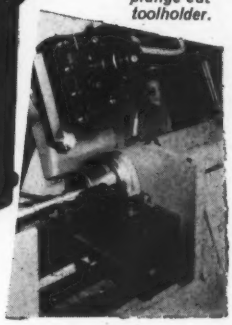
# DUBIED

## HYDRAULIC COPYING LATHE 517



*Automatic feed-change trips.*

*Auxillary plunge cut toolholder.*



**This Swiss-built automatic copying lathe is of unit construction and available in several forms according to need.**

**The 517 r 6 illustrated incorporates automatic change of motor speed, automatic 6-cycle attachment, automatic feed change, hydraulic plunge cutting attachment, hydraulic clamping and tailstock operation, and automatic indexing toolholder to copying slide.**

**The tool path can be pre-set for a number of roughing cuts, after which the toolholder in the copying slide automatically indexes to bring the finishing tool into position for the full copying sequence, or for selected diameters, hydraulically controlled from the template follower.**

**The plunge cutting toolholder mounted on the front slide advances to produce shoulders and undercuts as required.**
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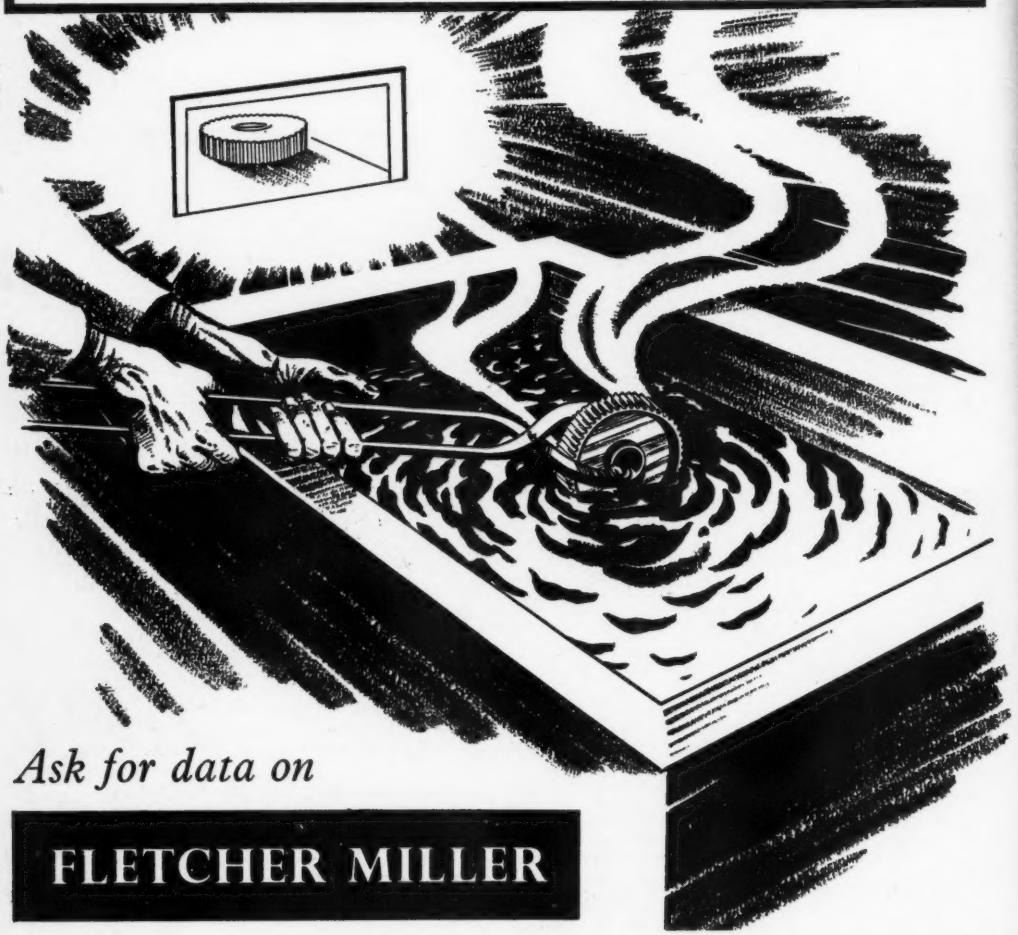

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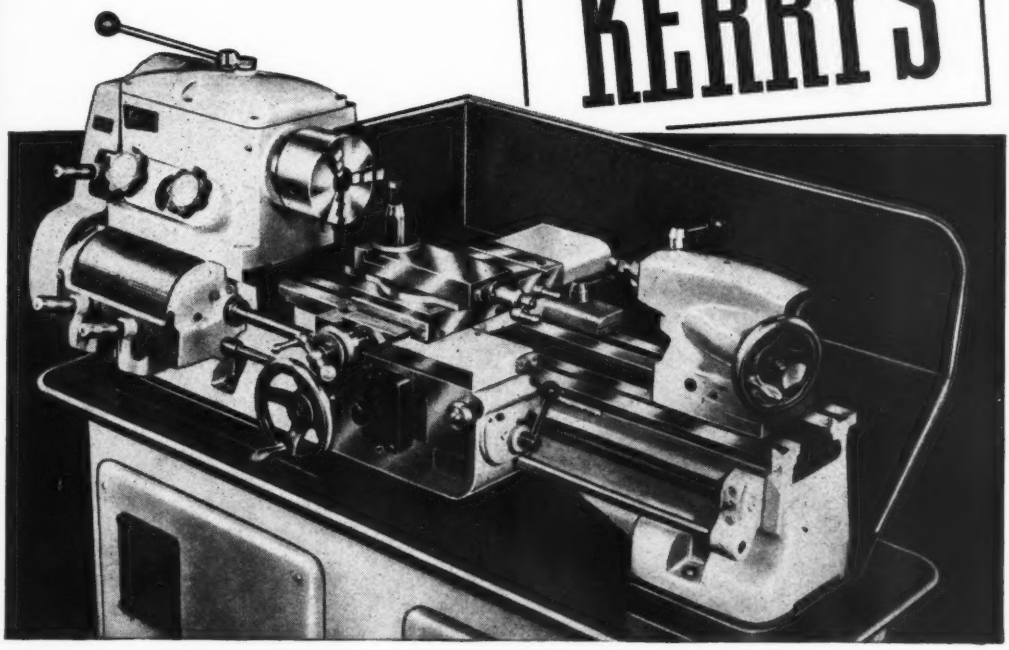

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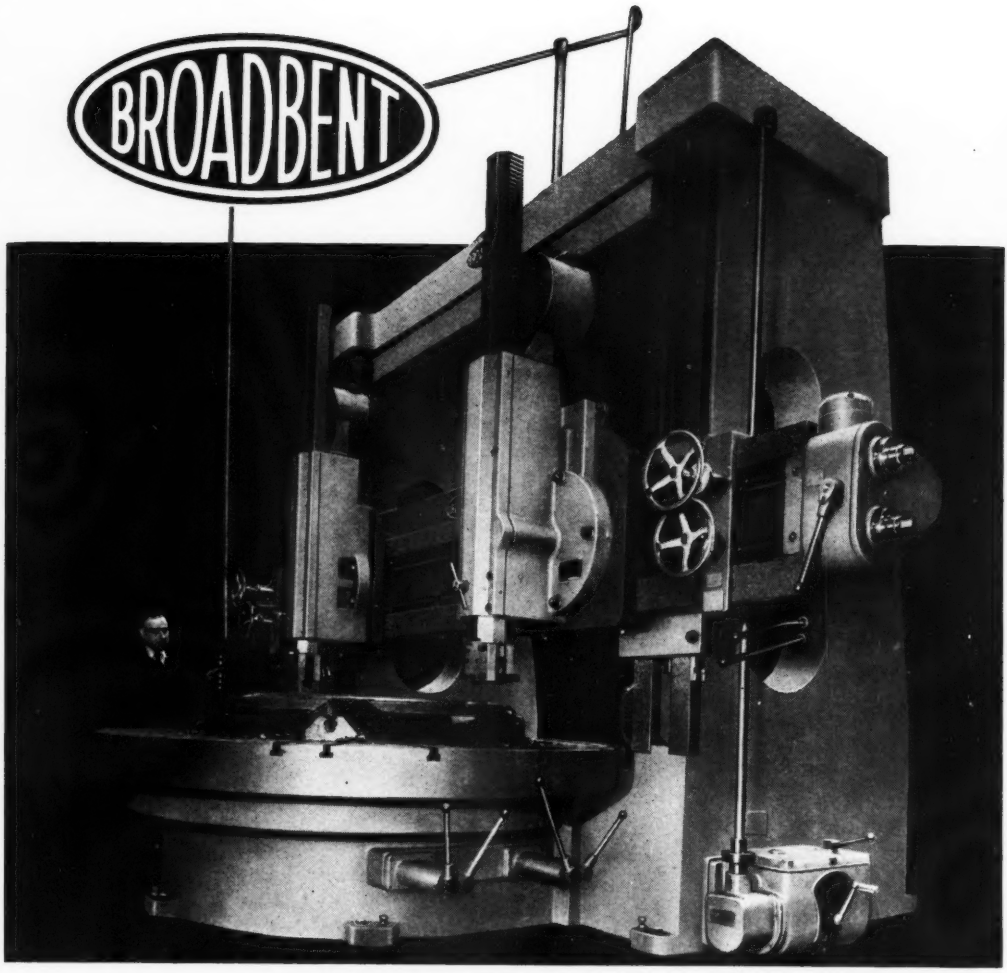

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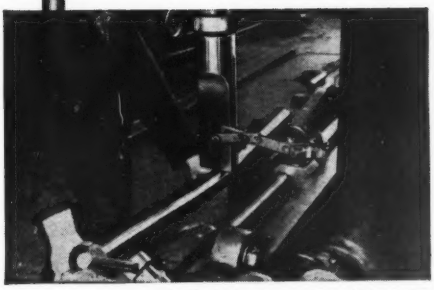

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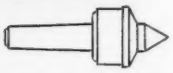

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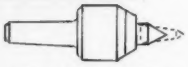

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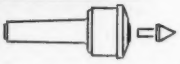

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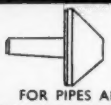

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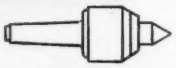

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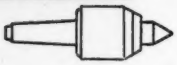

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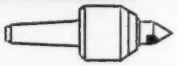

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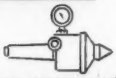

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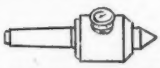

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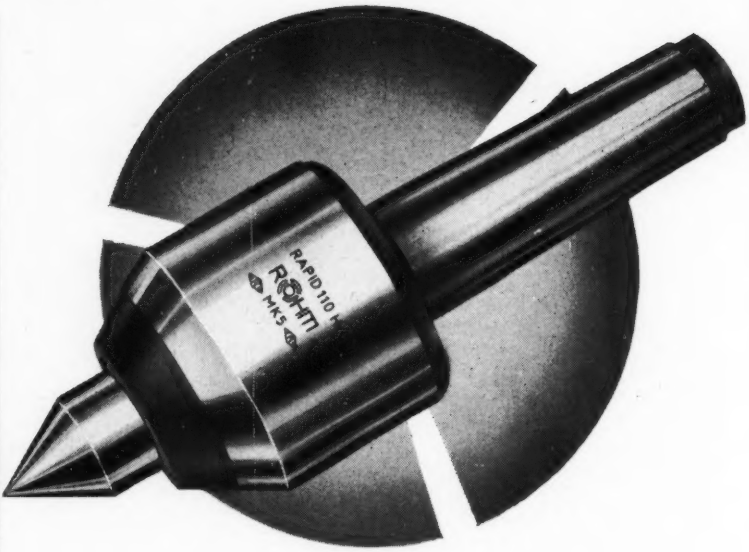


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Whatever your requirements in revolving centres there is a type and size in the ROHM range exactly to meet your needs. Each and every type has been specifically designed to ensure the highest possible performance. Ask for further details.

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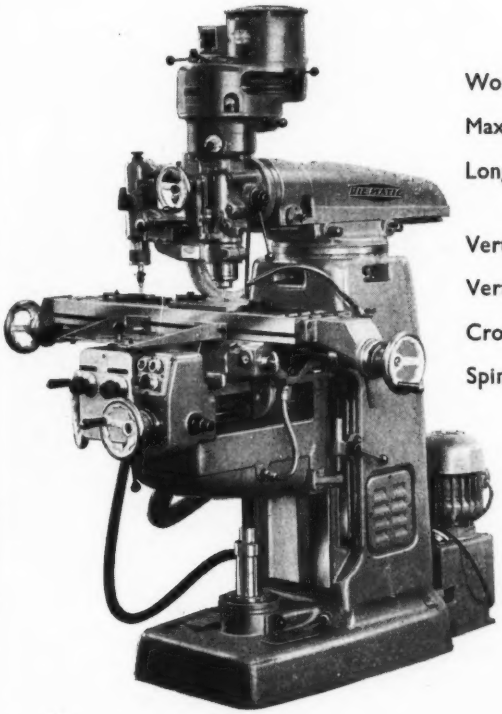
# DIE MATIC

## AUTOMATIC HYDRAULIC DUPLICATING DIE-MILLER

COMBINED WITH A

## TOOL ROOM MILLING MACHINE



SPECIFICATION

| | |
|---|---|
| Working surface ..... | 43" × 10" |
| Max. dist. spindle to table ..... | 14½" |
| Longitudinal table traverse ..... (hydraulic—manual) | 14" + 14" |
| Vertical (knee) (hydr.—manual) .. | 4" + 13" |
| Vertical (quill) (mechanical) ..... | 5" |
| Cross (saddle) (hydr.—manual).... | 10" + 10" |
| Spindle speeds range, r.p.m..... | 80 to 2715 |

**PRICE £2,125 - 0 - 0**

**A DEMONSTRATION MACHINE ALWAYS IN OUR SHOWROOMS**

**SPECIAL TERMS FOR MEMBERS OF B.A.M.T.M.**

HERBERT WIDDOWSON & SONS LIMITED
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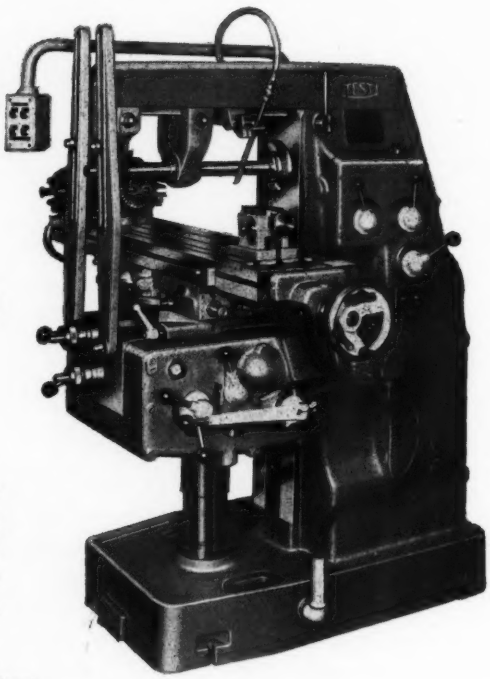
# TEST 2

## A NEW UNIVERSAL MILLING MACHINE



***FOR IMMEDIATE DELIVERY.***

***With these salient features:—***

- ★ **Hardened and ground gears**
- ★ **Power feeds and Quick Power Traverse in all directions**
- ★ **Speeds up to 2,000 r.p.m.**
- ★ **Electro Magnetic Clutch**
- ★ **Backlash Eliminator**

**BRIEF SPECIFICATION**

| | | |
|---|---|---|
| Table: | Working surface .. | 48in. by 11in. |
| Table Feeds: | Longitudinal .. .. .. | 29in. |
| | cross (without brace) .. | 9in. |
| | vertical .. .. .. | 17¾in. |
| Spindle: | Spindle Nose .. | No. 40 N.S. |
| | 18 speeds .. .. | 40 to 2000 R.P.M. |

**STANDARD EQUIPMENT—COS-PAR Dividing Head Vertical Milling Attachment Arbor, Front Braces Coolant Equipment etc.**

*Special terms for B.A.M.T.M. Members.* **Price £1,825.**

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## HERBERT WIDDOWSON & SONS, LIMITED

**Canal Street Works, Nottingham. Tel: 51891 (4 lines) Grams: TOOLS, NOTTINGHAM**

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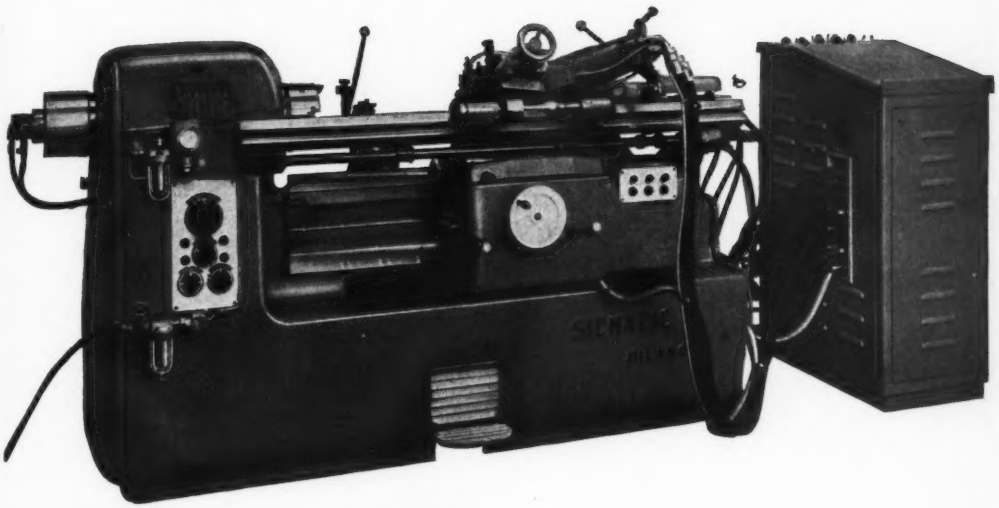

## Automatic and Semi-Automatic Hydraulic Profiling Lathes

**Specification**

| | |
|---|---|
| Bore of spindle | 2¼in |
| Spindle nose | 5in. A.S.A. |
| Max. swing over bed | 15½in. |
| Max. swing over saddle | 9¾in. |
| Max. length turned | 27½in. |
| Hydraulic traverse of copying slide | 4in. |
| Hydraulic feed of tailstock spindle | 4¾in. |
| Number of feed rates to copying slide | 48 |
| Max. tool pressure | 1,300 lbs. |
| Approx. nett weight | 5,000 lbs. |

## 7 POINT FEATURES INCLUDE

1 Capacity.
2 Duplomatic Hydraulic System.
3 Hardened Bed Slideways.
4 Auto cycling up to six depths of cut.
5 Hydraulic tailstock for drilling and boring.
6 Uses template or existing component.
7 Eight models to choose from.

**Basic price under £2,000.**

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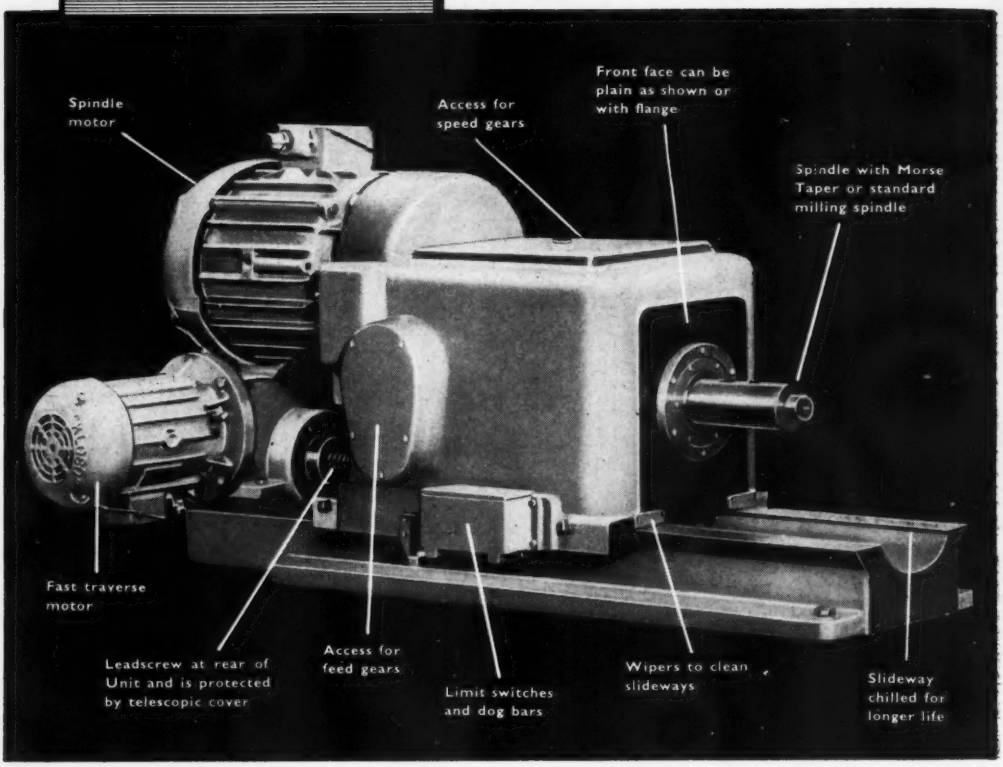
# AMT ELECTRO MECHANICAL SCREW FEED UNIT HEADS


Spindle motor
Access for speed gears
Front face can be plain as shown or with flange
Spindle with Morse Taper or standard milling spindle
Fast traverse motor
Leadscrew at rear of Unit and is protected by telescopic cover
Access for feed gears
Limit switches and dog bars
Wipers to clean slideways
Slideway chilled for longer life

## *Available in*

## 4 SIZES from 1 to 20 H.P.

**for DRILLING, JUMP GAP DRILLING, COUNTERBORING, TAPPING, BORING, DEEP HOLE DRILLING, 'SPOT FACING' AND MILLING**

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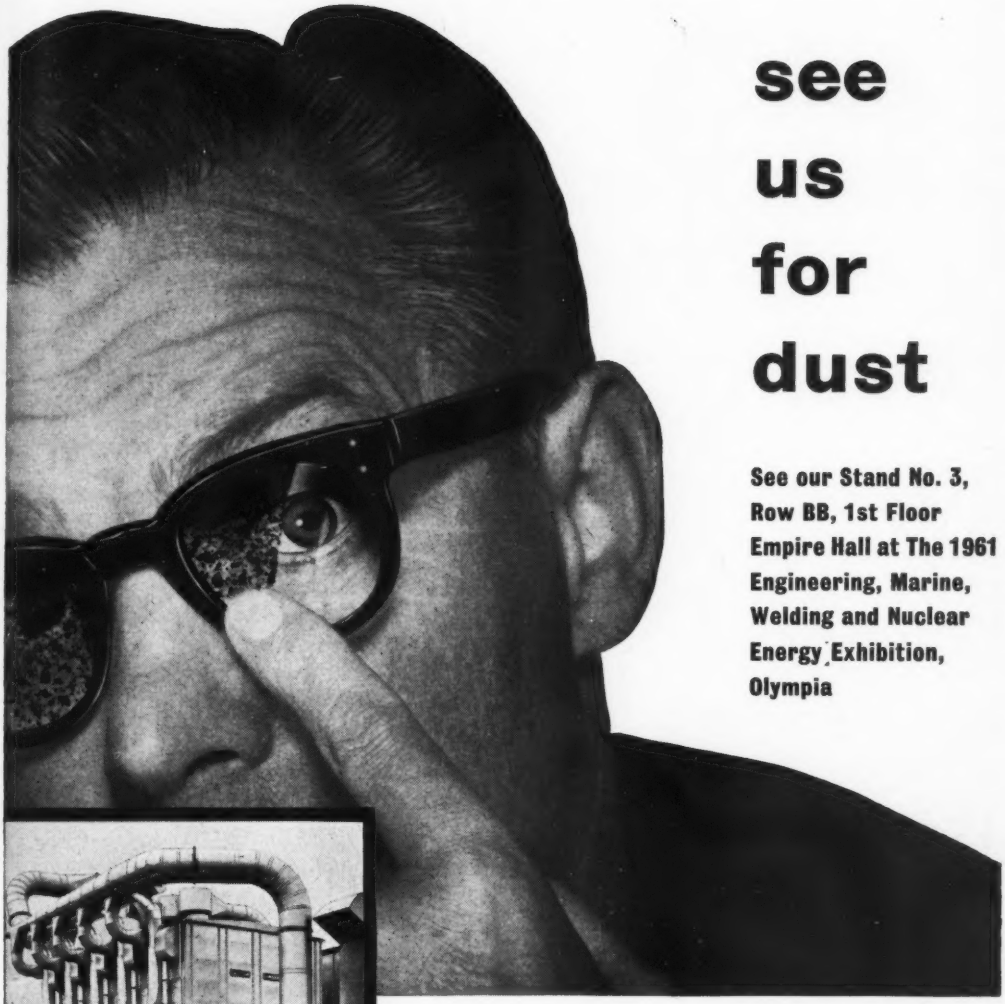
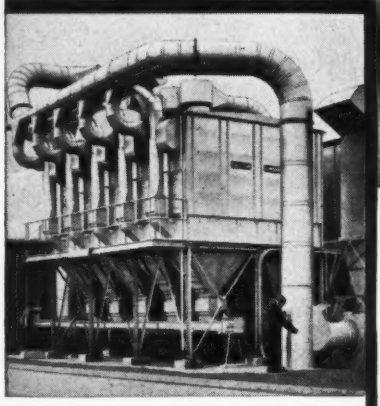


# see us for dust

**See our Stand No. 3, Row BB, 1st Floor Empire Hall at The 1961 Engineering, Marine, Welding and Nuclear Energy Exhibition, Olympia**



**This is a Dallow Lambert Drytube**
Type 3/5000 fabric sleeve dust filter handling 16,000 cfm. of dust laden air with drag link conveyor system for discharging dust into storage hopper for automatic bagging.

During 40 years of specialization in industrial dust control we've learned the answer to most dust problems. Take fine dry dusts such as graphite for example. Our answer to them has been the Drytube dust filter, which is particularly suitable for handling fine dry dusts where high collection efficiency is required.

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DALLOW LAMBERT LIMITED · THURMASTON · LEICESTER · TELEPHONE SYSTON 3333 (7 LINES)

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*Here's precision plus—*
*at the right price!*

YOU'LL BE 100% SURE OF IT WITH A

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## MF5 Mk II DRILLING MACHINE 1" CAPACITY

MF5 Mk II—here's your codeword for accurate, economic drilling! Everything about this robust job adds up to just that! And what other machine offers such a specification at a comparable price?

Solid construction throughout means you've got real stability. The column is solid steel, 3½" diameter, and is ground all over. An oil immersed gearbox, totally enclosed in the Drill Head, gives eight spindle speeds (range 80-1,500 r.p.m.). Throat depth 9". Choice of High or Low speed setting for each of four Vee belt positions, thanks to accessible gear change lever with positive action.

**1.** Complete rigidity from No. 3 M.T. taper (internal type).

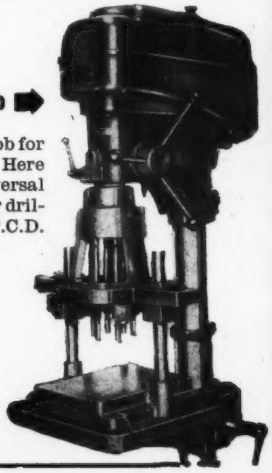
**2.** Maximum rigidity again from the extra large drill table-ground working surface is over 225 sq. in., and you have rack and pinion for raising and lowering, and ample coolant trough.

**3.** Friction/clutch type Depth Stop—integral with star wheel—has graduated scale for accurate depth drilling.

**Price**
**£125.15.0.**
Coolant equipment and chuck guard extra.

**IDEAL FOR MULTI-SPINDLE DRILLING TOO**

The MF5 Mk II is just the job for light multi-spindle work. Here you see it fitted with a universal type multi-spindle Head for drilling up to a maximum P.C.D. of 6".



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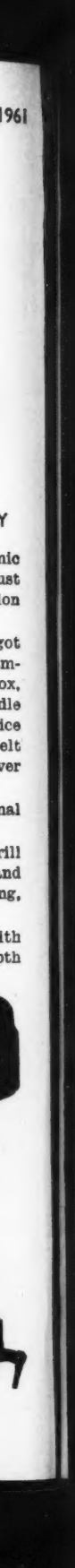

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BY HAND
BY FOOT
BY PUSH BUTTON
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BY SOLENOID
P.815
RED RING AIR EQUIPMENT
One of the most popular range of valves is this P.800 series available as lever, foot, toe, air pressure or solenoid operated. The basic valve is engineered to give the maximum number of trouble free operations, unaffected by dirt because it is self cleaning, full air flow through valve giving faster response to cylinders, and easy fixing to any machine, make this range the most versatile available.
¼" and ⅜" BSP sizes.
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Tear this off, pin it to your letterheading and post to STUART DAVIS LIMITED COVENTRY
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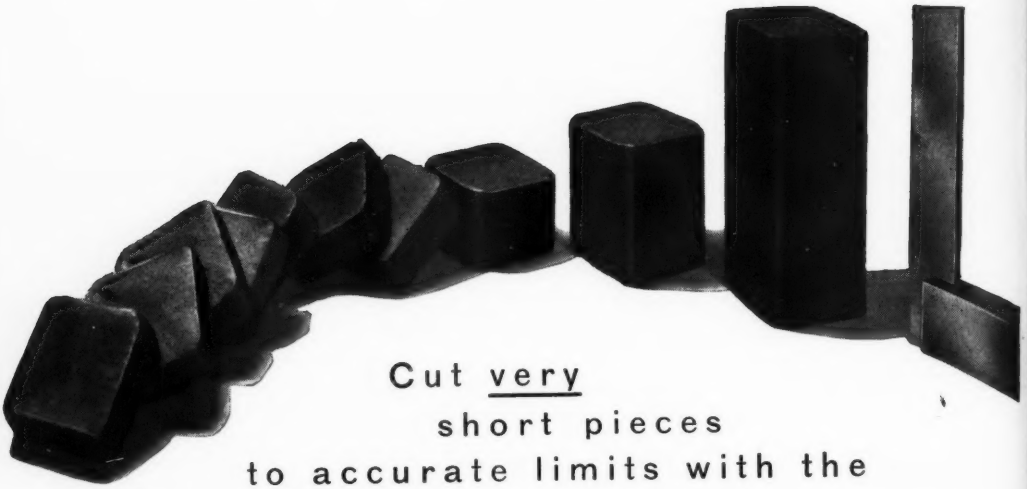
Details please



Cut very
short pieces
to accurate limits with the

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A new range of BROOKE Unit Heads and the new CENTRE COLUMN ROTARY INDEXING MACHINE (patents applied for)

Special features on this machine include:—

- ECONOMIC USE OF FLOOR SPACE
- PATENT TABLE-CENTRALISING AND INDEXING DEVICE WHICH OBVIATES JIG-BORING
- ACCURATE TABLE SETTING BY AUTO-COLLIMATION
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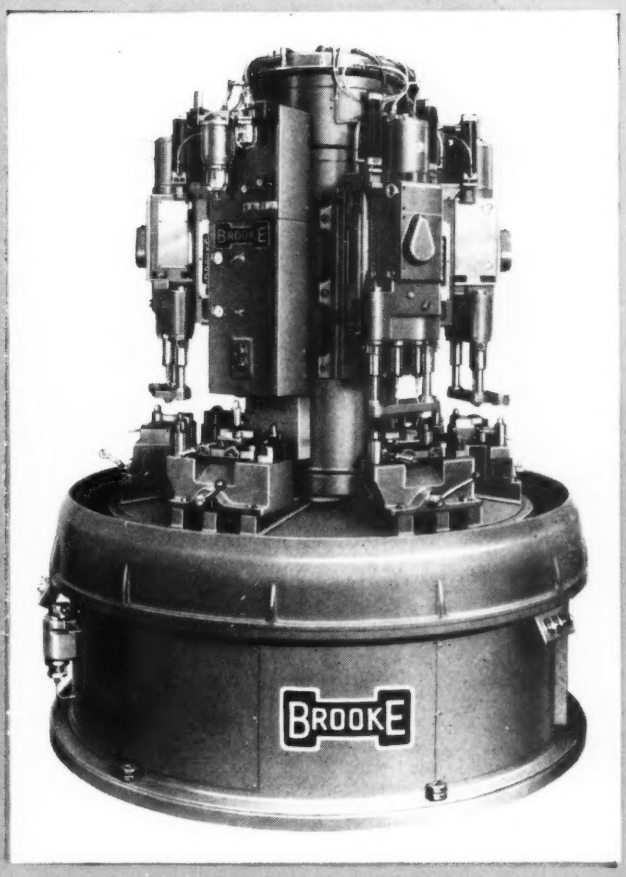
- LATEST BROOKE UNIT HEADS




BROOKE TOOL AUTOMATION LTD.

(MACHINE JIG & FIXTURE DIVISION)

CARDINAL WORKS, ALDRIDGE ROAD, PERRY BARR, BIRMINGHAM, 226

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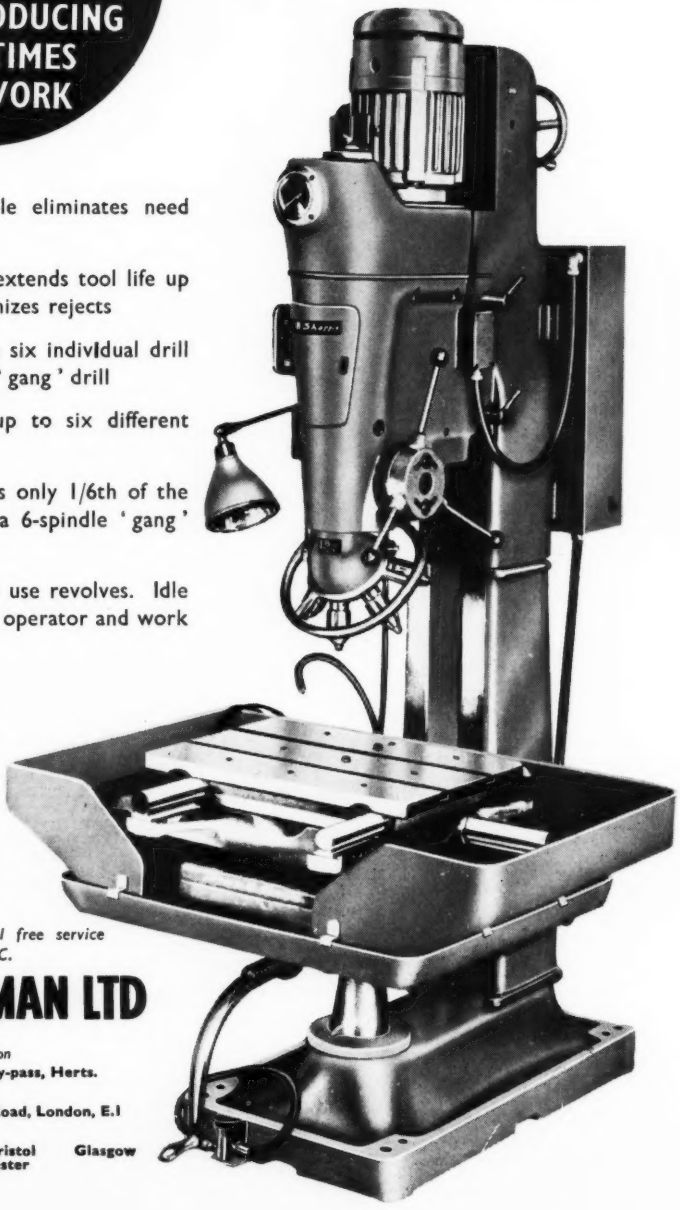
THE NEW

# Brown & Sharpe TURRET DRILL

PAYS FOR ITSELF IN ONE YEAR WHILE PRODUCING 2 TO 5 TIMES MORE WORK

**MADE AT PLYMOUTH IN THE NEW WORKS OF BROWN & SHARPE LTD.**



- Work-positioning table eliminates need for expensive jigs
- Accurate positioning extends tool life up to 10 times and minimizes rejects
- One machine replaces six individual drill presses or a 6-spindle 'gang' drill
- One operator uses up to six different tools in any sequence
- Saves power—requires only 1/6th of the power necessary for a 6-spindle 'gang' drill
- Safe—only the tool in use revolves. Idle tools point away from operator and work

**SPECIFICATION**

| | |
|---|---|
| Turret Spindles | 6 |
| Drill capacity | ½in. |
| Quill travel | 6½in. |
| Spindle speeds | 200 to 4,000 r.p.m. |
| Motor | 1 h.p.—2 speed |
| Table surface | 22 × 24in. |
| Table travel | 16½in. |
| Head travel | 15in. |
| Max. clearance | 32½in. |
| Throat clearance | 14½in. |

*Write for details of the special free service offered by THE TOOLING CLINIC.*

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*Machine Tool Division*
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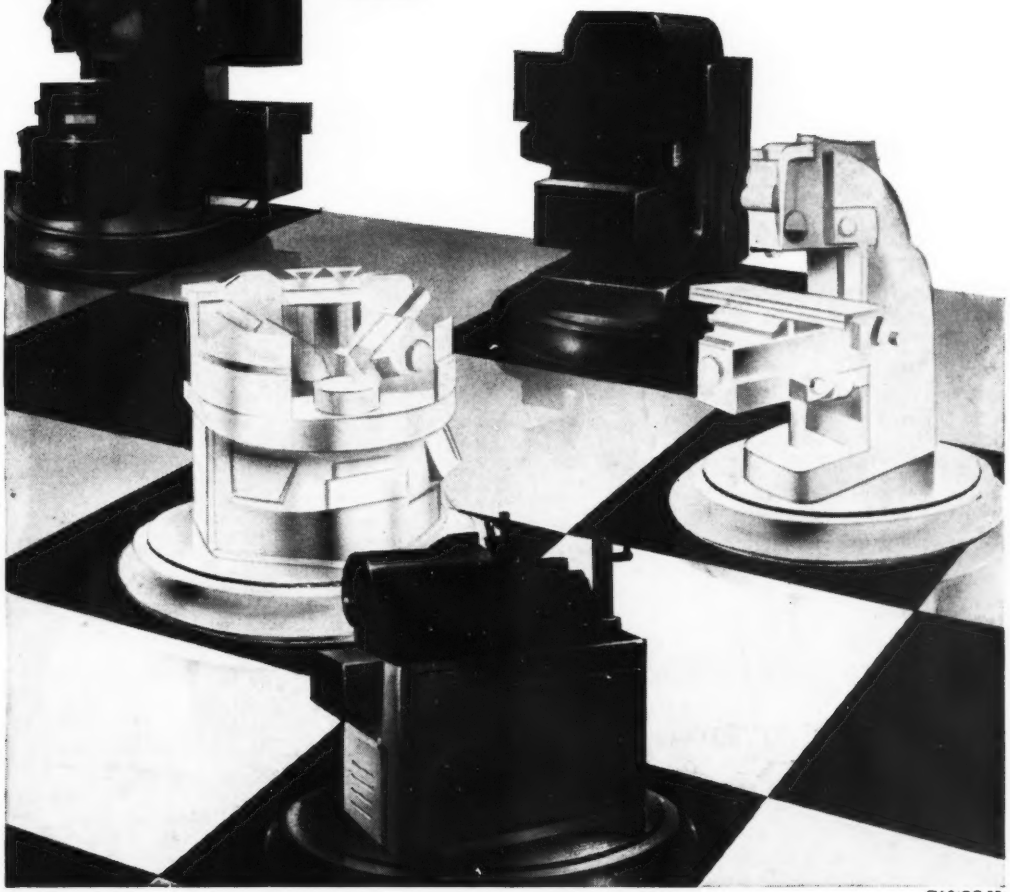

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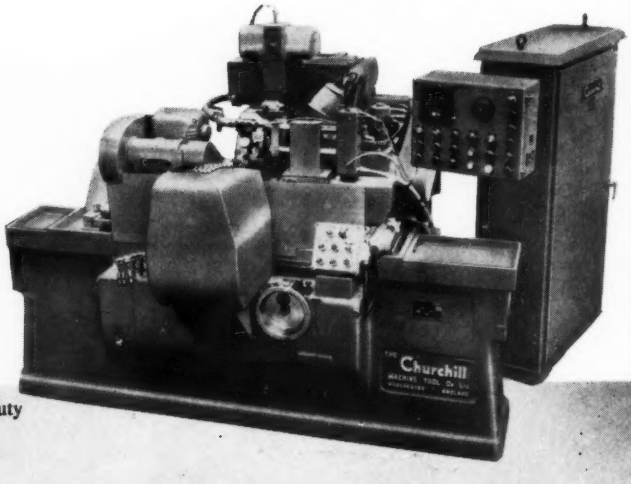
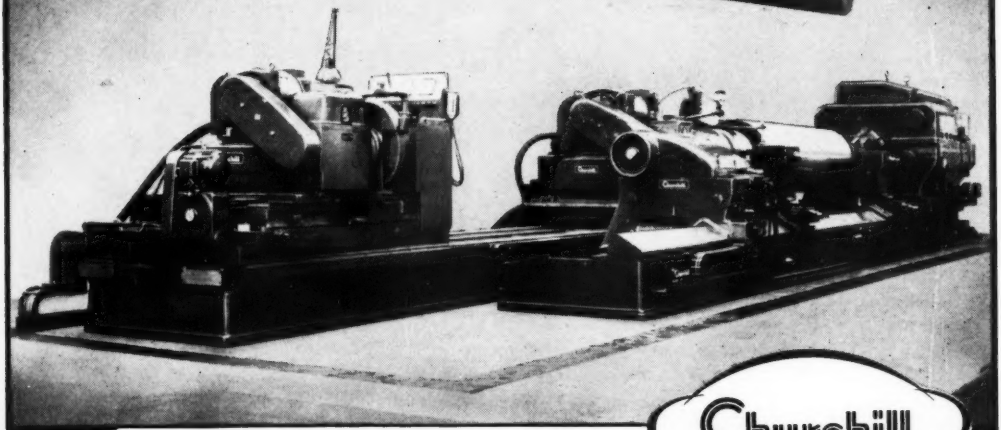



Model "TWR" 72in. x 360in. Heavy Duty Roll Grinding Machine



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**THE CHURCHILL MACHINE TOOL CO. LTD.**

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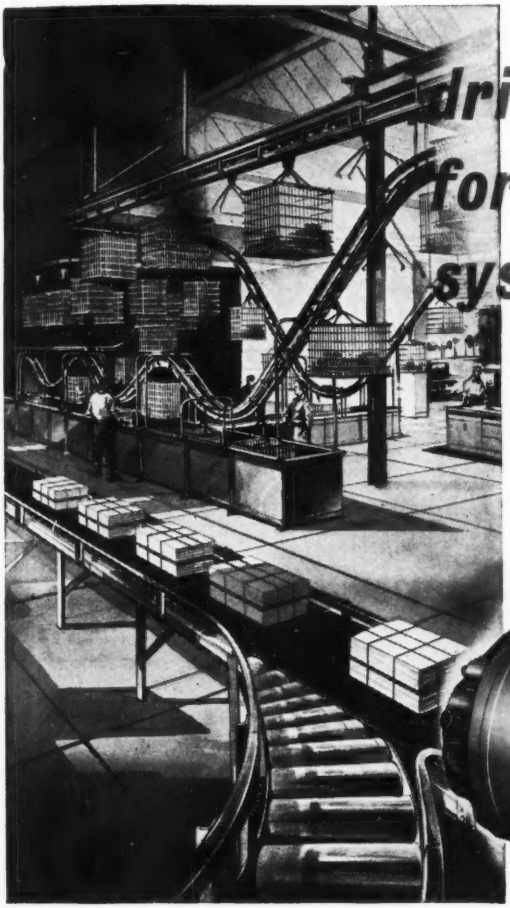

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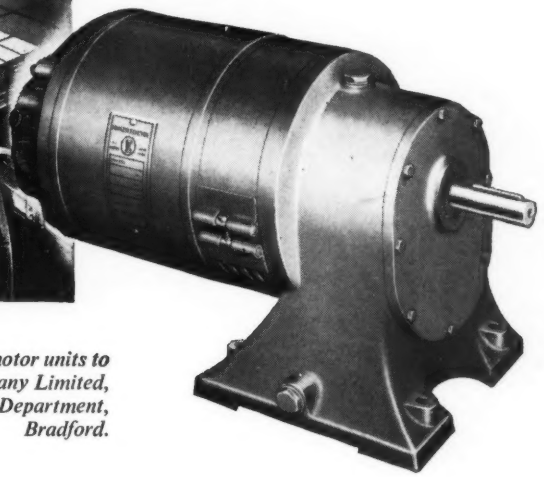
Thousands of 'ENGLISH ELECTRIC' f.h.p. geared motor units are in service throughout industry providing constant low speed drives on conveyor systems.
These robust, compact motors are available in drip-proof, totally-enclosed and totally-enclosed fan cooled enclosures with a wide range of mountings and with output speeds from 1 to 873 r.p.m. and from 21·0 to 3,740·6 lb./in. torque.



*Send for full details of f.h.p. geared motor units to The English Electric Company Limited, F.H.P. Motors Department, Bradford.*

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FHP 42

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It can happen now and again, even in the best regulated machine shops—a faulty machine or small error in setting results in a completely unserviceable run of components on which expensive work has already been done. Fortunately, in many cases, these expensive parts can be reclaimed by 'Fescol'-ising. This process of heavy electro-chemical deposition builds up the components oversize. Accurate machining is then carried out. Fescol Limited undertake the whole job including deposition and the subsequent machining operation.

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TGA 968

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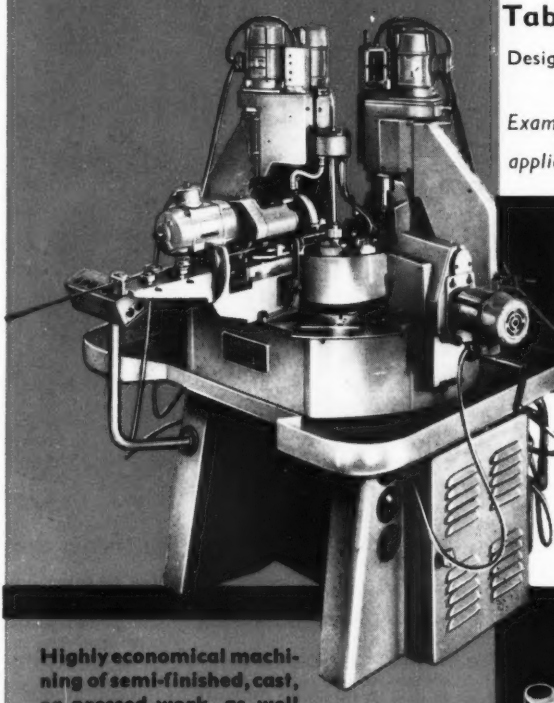
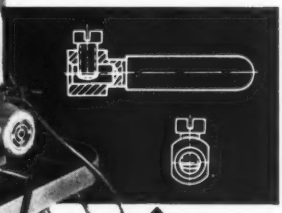
**VARIOMATIC Automatic Indexing Table Machines**

Design HAHN & KOLB

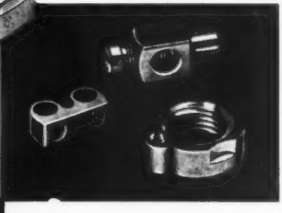


*Examples of application:*



▲ Socket pin manufactured from coiled stock in one working cycle with 9 machining units. Output: 40 pieces per minute, including a screw driving operation. Shown in actual size.

**Highly economical machining of semi-finished, cast, or pressed work, as well as of small size components from coiled or bar stock.**



The machine shown is set up for the production of connectors from sectional coiled stock.

**Up to 14 machining units can be provided. Max. drilling dia. in steel 5/16 inches. Max. thread diameter (M8) 5/16 inches**

**HAHN & KOLB**

**(Great Britain) LTD.**

243-245 Horn Lane. Tel.: ACOrn 8938/9

**ACTON, LONDON W3**

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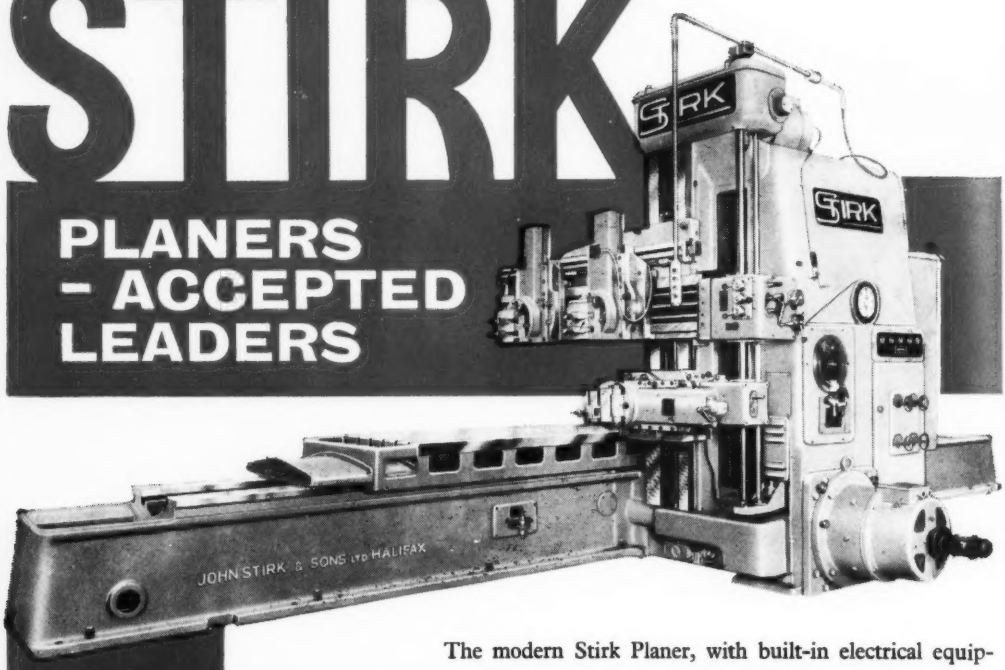
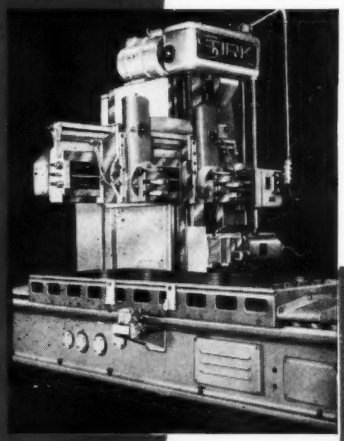
# STIRK

## PLANERS - ACCEPTED LEADERS




The modern Stirk Planer, with built-in electrical equipment, possesses many distinctive features which make it one of the world's finest planing machines. The easy control and fine accuracy of the modern planing machine is due in no small measure to the continuous development of Stirk Planers. For more than fifty years Stirk Planers have influenced the design and set the standard by which others are judged.

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ARE BACKED BY OVER 30 YEARS' EXPERIENCE IN GEAR PROCESSING

The shaving cutter is not just another tool which any experienced tool shop might be expected to produce satisfactorily.

Making the successful rotary gear shaving cutter requires not only the consummate skill of the master toolmaker, but also a thorough knowledge of gear practice.

No group anywhere has had as much cutter experience as Red Ring engineers who developed Rotary Gear Shaving. They have been learning more and more about cutters for over 30 years.

It would be convenient indeed if all cutters could be made to a standard design, interpolating only for variations in basic gear characteristics.

Unfortunately, there are many variables which often make modifications essential. But, how much modification—where to apply it. The answer again lies in EXPERIENCE plus the performance data to substantiate it.

Service of this type provided by Red Ring engineers can make a valuable contribution to gear processing operations.

When considering shaving cutters, it is just as well to inquire how much experience the cutter manufacturer has had in this highly specialized field—whether he is prepared to assist in the development of cutters which will be most effective on specific applications.

Every Red Ring cutter design is proved by actual try-out before it is released.

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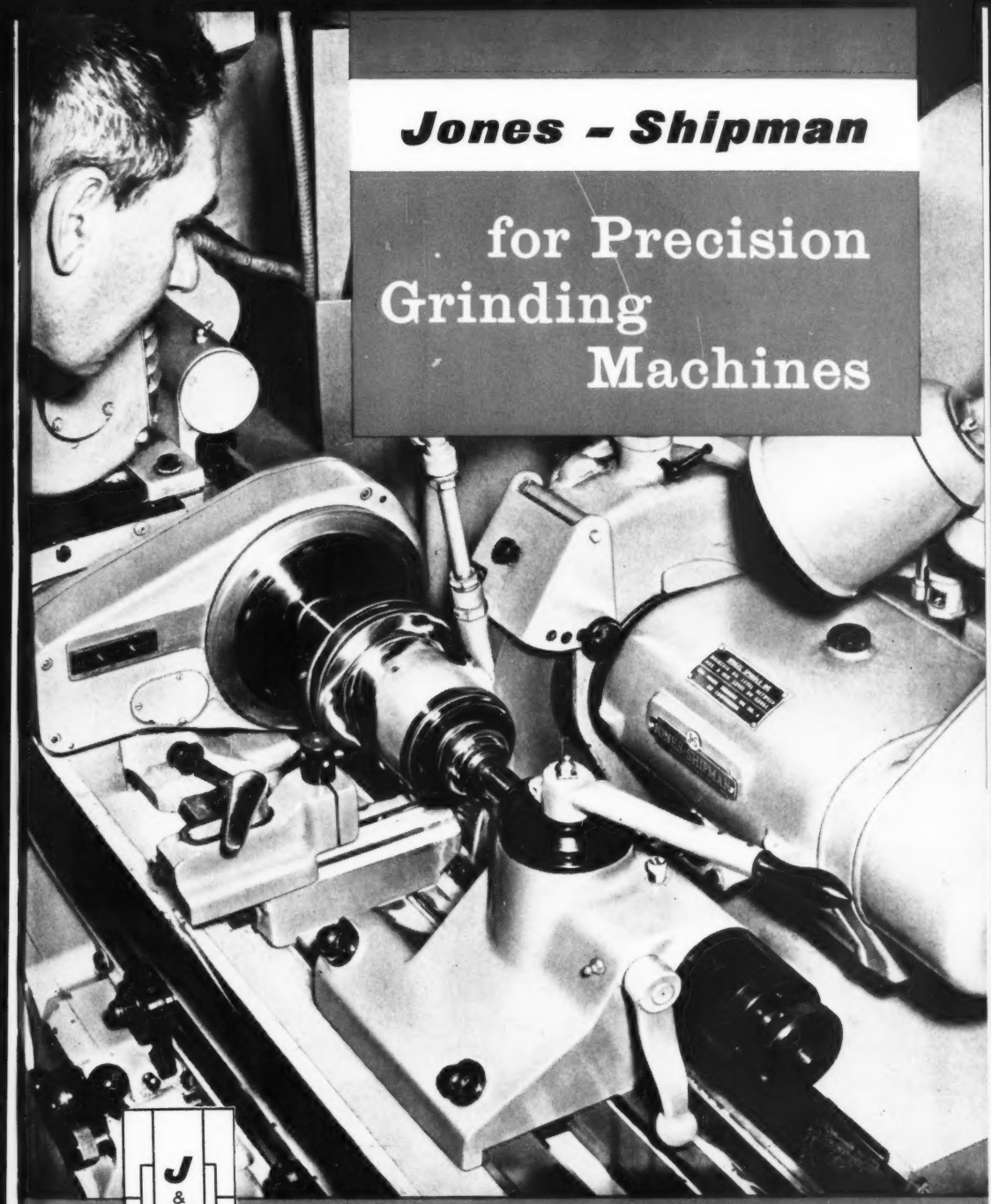

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J & S

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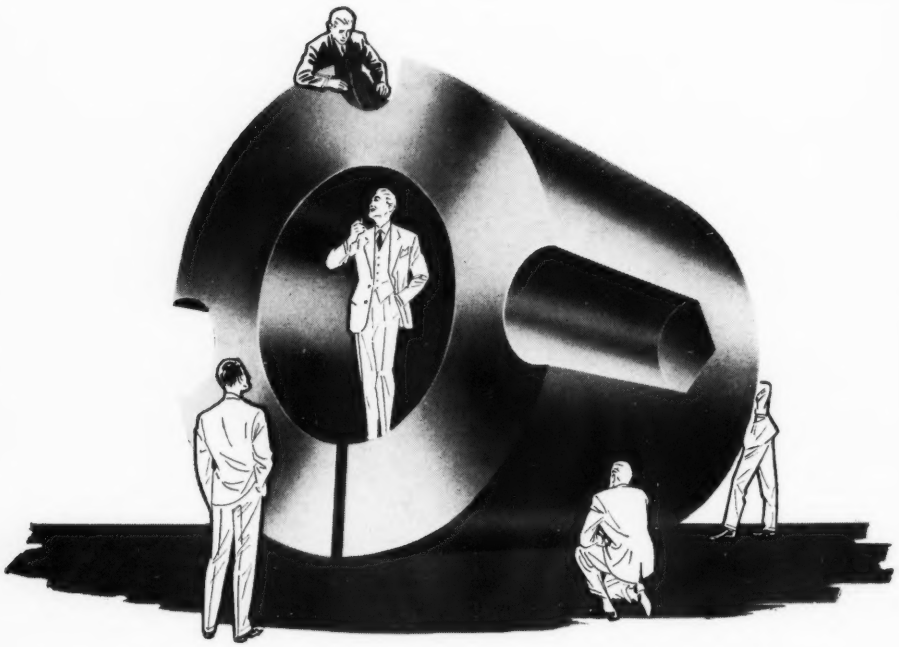

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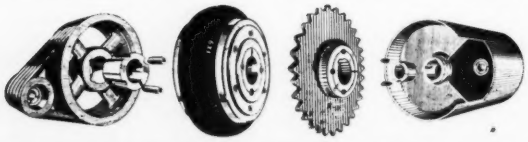

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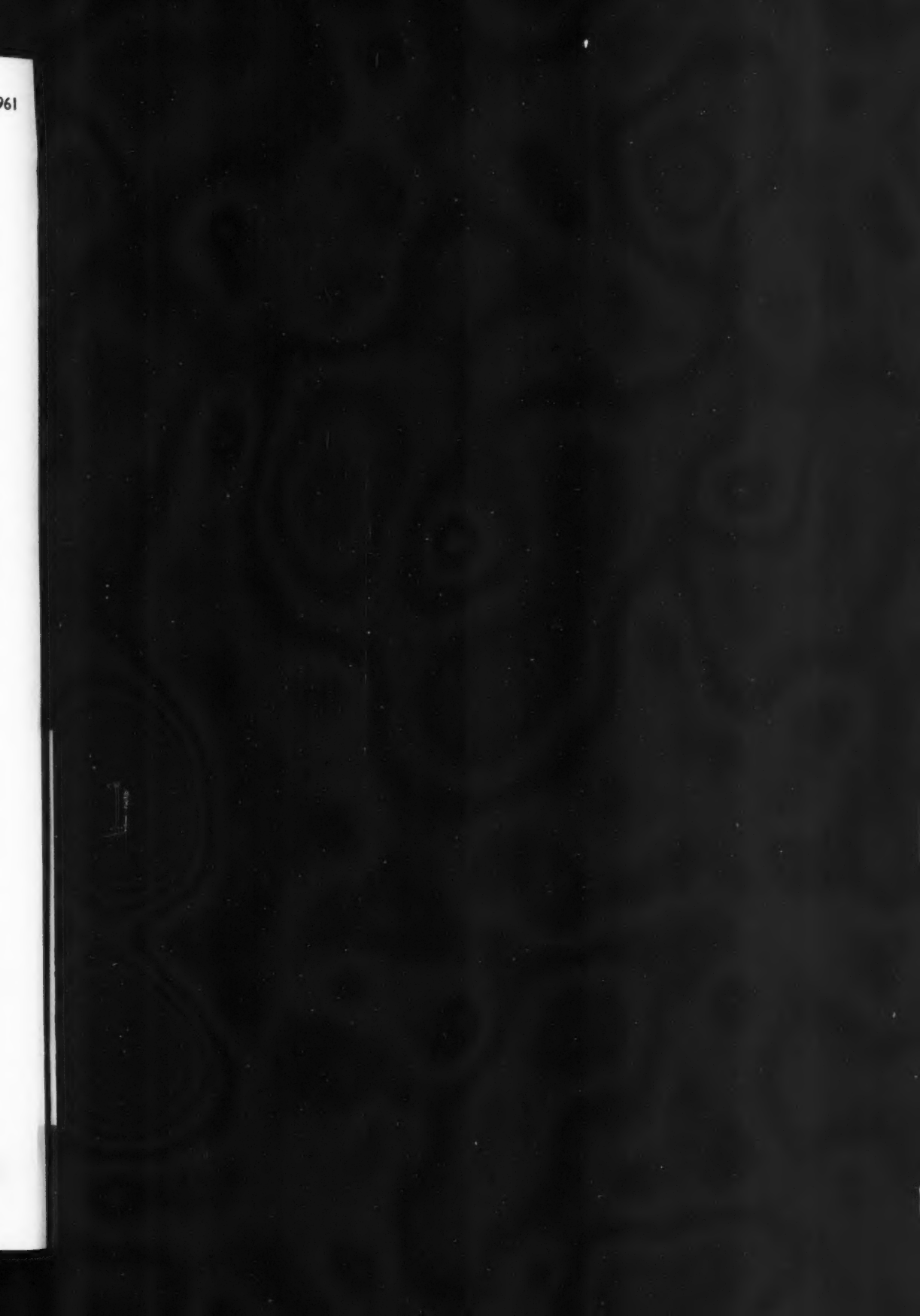

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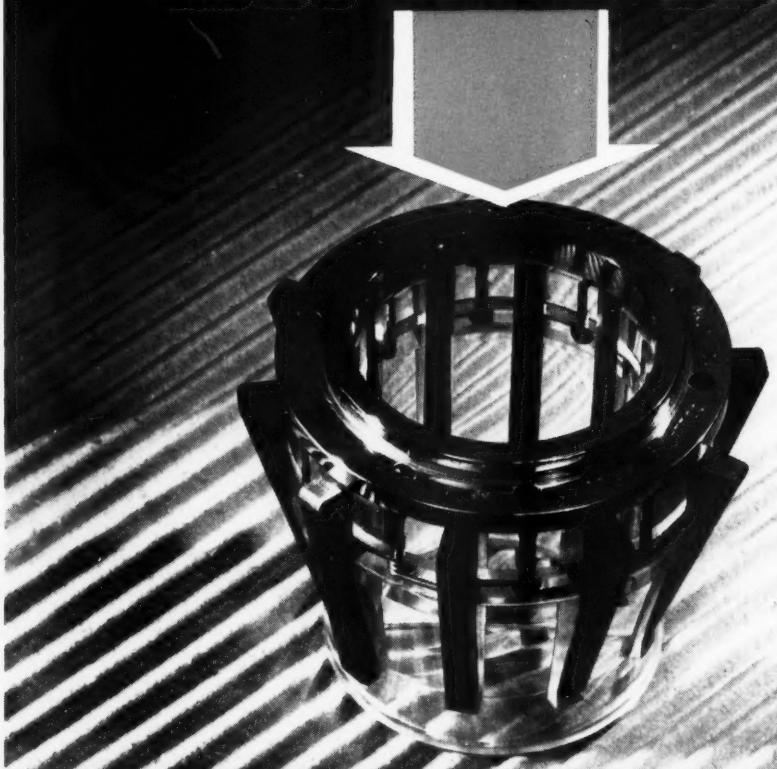

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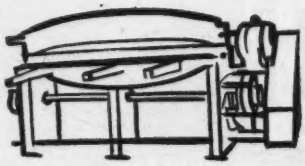

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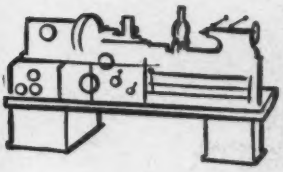

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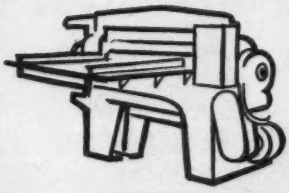

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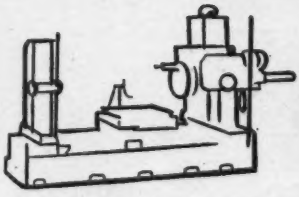

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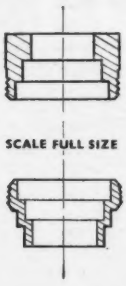
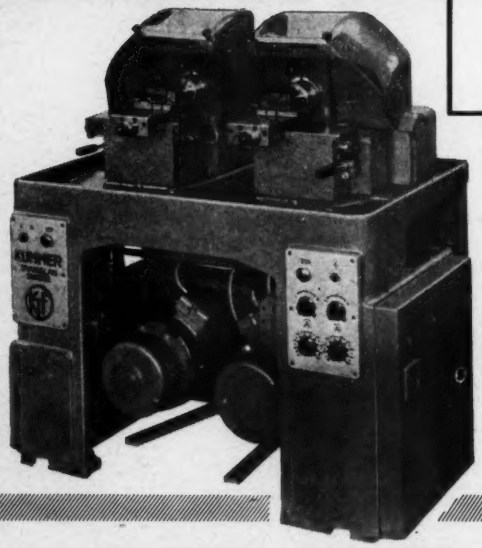



**Operation 1**
Loading 6 secs
Machining 28 secs
Material—BRASS (Billet)

**Operation 2**
Loading 6 secs
Machining 43 secs
Material—BRASS
pre-machined blank from Op. 1.

## K20 Semi-Automatic Twin-Head PRECISION LATHE...



- Work head spindle can automatically operate at high or low speeds according to preselected cutting speeds.
- Camshaft driven from main spindle.
- Cam accelerator reduces machining cycle time.
- Easy loading of component into chucks.
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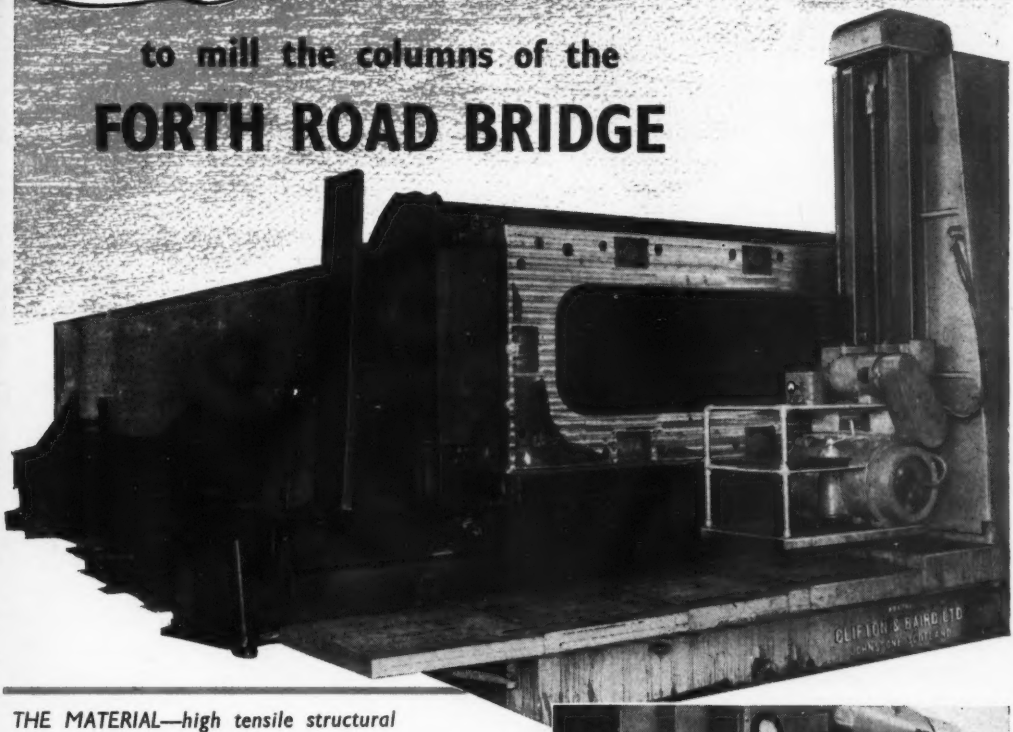


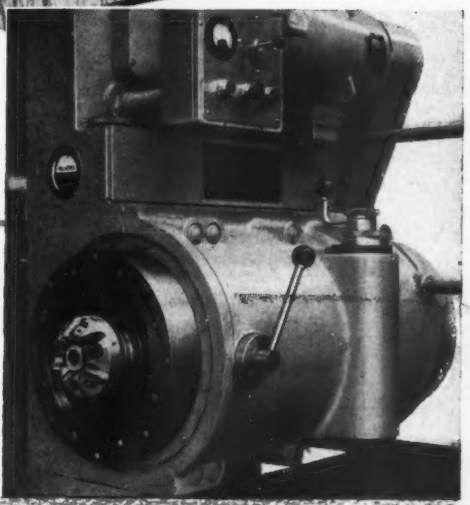

*THE MATERIAL—high tensile structural steel.*

*COLUMN SIZE—***47ft. 6in.** *long* × **9ft. 6in.** × **5 ft.**

*THE MACHINED AREA—***9ft. 6in.** × **5ft.**

*THE DEPTH OF CUT—approximate* **¼in.** *using a 3in. dia. Type FM45 FUTURMILL.*

*FEED RATE—***60in.** *using 'PROLITE' GRADE 20K.*



The Prolite-Futurmill FM45 is a cutter of unique design using throw-away blades which give improved performance, lower production costs, and longer cutter life. Our engineers are available at any time for consultation and demonstration in your works.

*Photographs by courtesy of Sir William Arrol & Co. Limited, and Clifton & Baird Ltd., designers and builders of the machine.*

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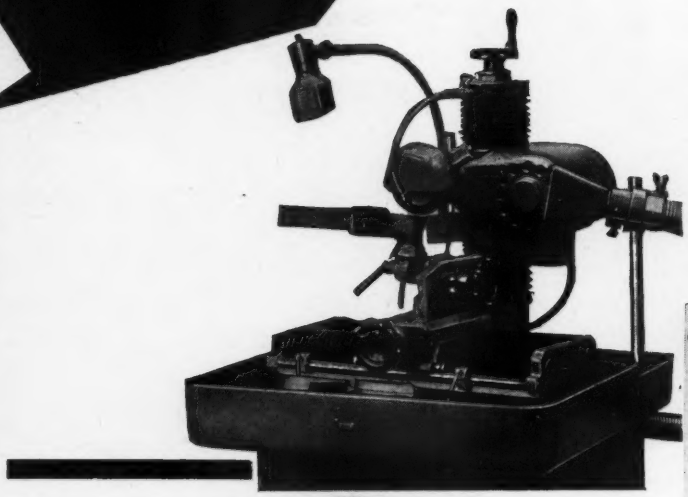
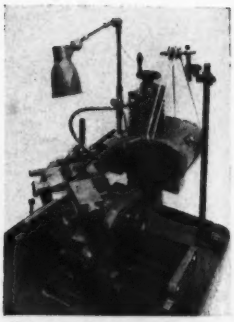
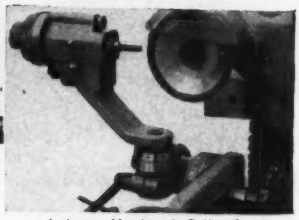
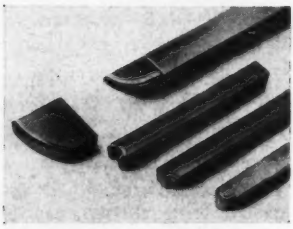




Grinding of Profile Cutting Tool



Indexing Head with Collet Chuck



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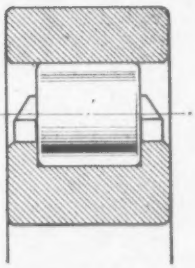

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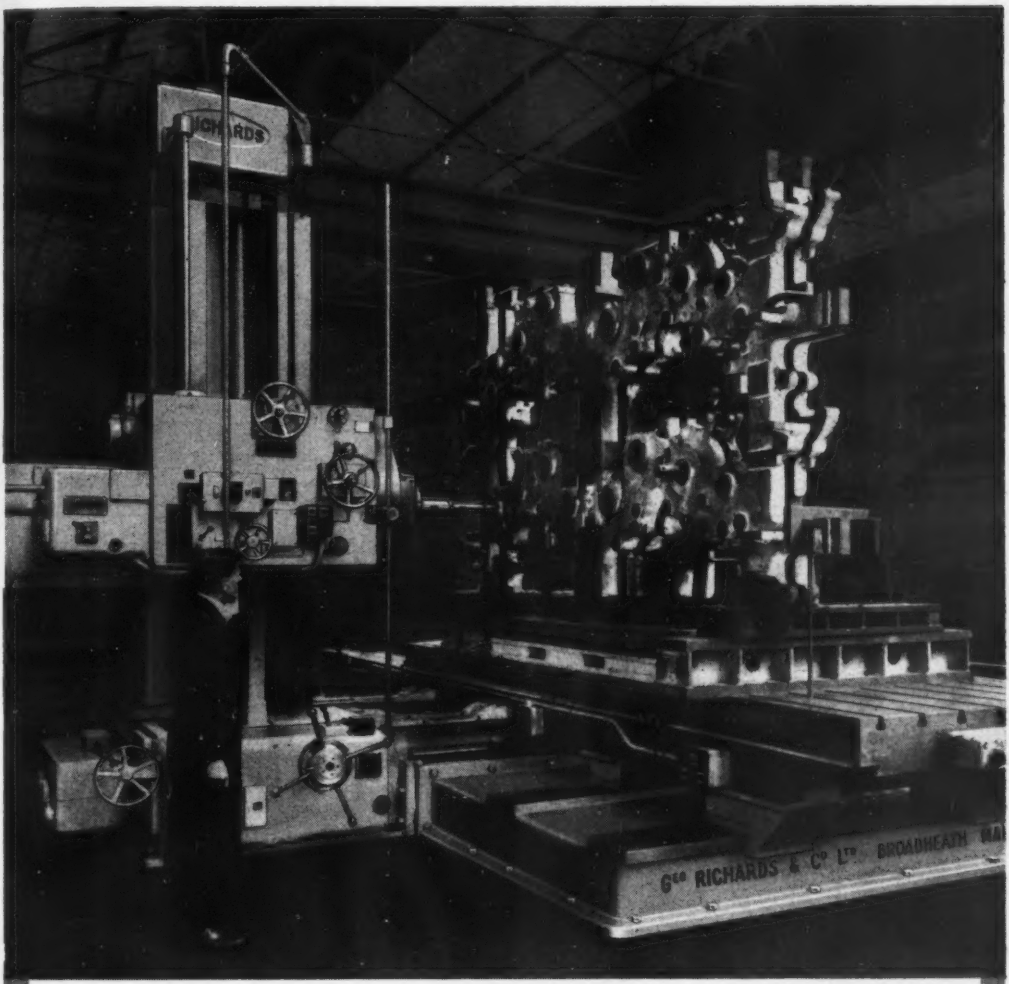


Illustrated above is a Richards Wide Bed Type Horizontal Boring, Facing and Milling Machine, with Traversing Spindle, in plant at the Preston works of the Goss Printing Press Co. Ltd. The machine is shown boring and facing the side frames of a printing machine, and has an 18ft. 0in. wide bed, a 15ft. 0in. by 6ft. 0in. sliding table, fitted with optical scale projectors.

The machine is representative of a full range of Horizontal Boring, Facing and Milling Machines, which include Table, Wide Bed, Saddle Support, Floor and Planer types, supplied with and without traversing spindle. The range can be further increased with combinations of extended height, bed length and width, and table size if required.

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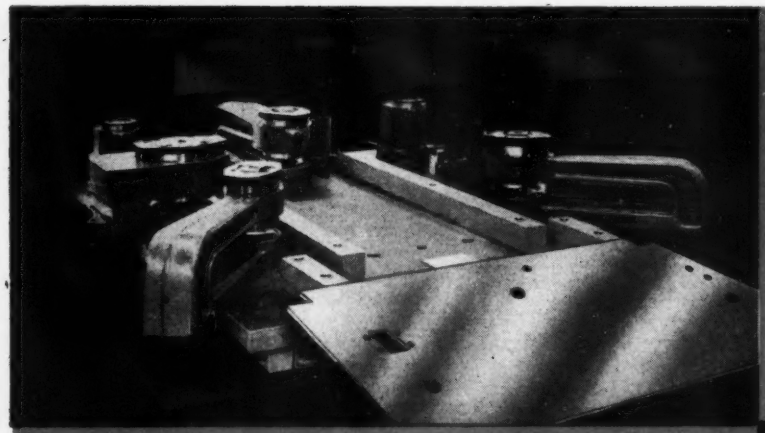

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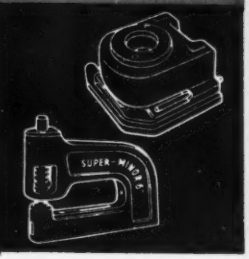


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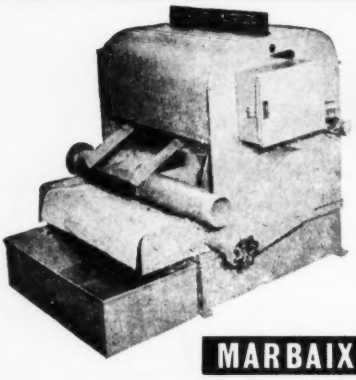

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**MAGNETIC AND FABRIC FILTERS**
*for 2 STAGE COOLANT CLEANING*

Lengthen tool and plant life. Improve finish by this 2-stage filter. Combining powerful magnetic screening plus sure filter collection of all non-magnetic matter.

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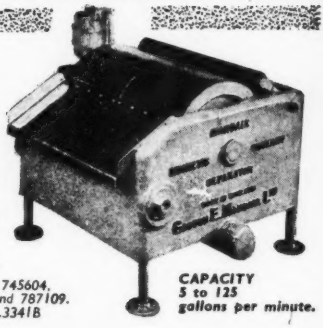

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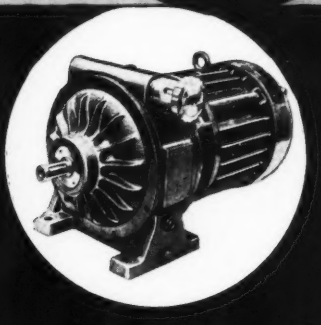

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# Abstracts of Principal Articles

## A Brazilian Machine Tool Plant .. P. 524

At the works of Maquinas Agricolas Romi, S.A., Santa Barbara d'Oeste, Brazil, there is a central tool, drawing, and gauge stores, in the main machine shop. Broaches are stored in a rotating rack, and statistical records are kept for all tools and gauges. The spindle department includes a deep-drilling machine built by the company, and a specially-adapted Newall grinding machine, whereby an oscillating motion is imparted to the work, when finishing the seating pads for sliding gears on lathe spindles. A special Oerlikon Italiana machine is installed for rough, semi-finish and finish boring headstocks and similar components, and has three machining heads. Boring tools are mounted in spindles which run in Timken taper-roller bearings in sliding quills, and steady bushes can be moved into position by vertical slides. The machine has been built to Romi specification, and is of unit construction, with hydraulically-powered traverse motions. A typical boring sequence on the machine is described. (MACHINERY, 98—8/3/61.)

## Producing Rotors for Gas Test Meters P. 534

Equipment manufactured by Parkinson Cowan Industrial Products—a division of Parkinson Cowan, Ltd., includes "wet"-type laboratory gas test meters. This meter incorporates a rotor, partly submerged in water, which has helical measuring compartments. The rotors are built-up from flanged helical pressings, the flanges of which are soldered together. The methods employed for producing and assembling the pressings, and a special technique which was used for machining the various helical tooling elements, are described. (MACHINERY, 98—8/3/61.)

## A New Stellite Hard-facing Process P. 538

Delloro Stellite, Ltd., have introduced a new process for the deposition of Stellite heat-, abrasion- and corrosion-resistant hard-facing powders, which is known as powder welding. The new process is carried out with the aid of a specially adapted Schori powder spraying pistol, to which powder is fed from a hopper by a stream of argon. Oxygen and acetylene provide the heating flame, and it is claimed that the rate of deposition is twice that obtained with normal techniques employing gas welding, and four times that obtained with arc welding. (MACHINERY, 98—8/3/61.)

## Numerically-controlled Machining Operations in the Giddings & Lewis Works P. 541

A total of 14 numerically-controlled machines is in operation at the works of Giddings & Lewis Machine Tool Co., U.S.A., and their associates. One machine is a skin and spar miller with Numericord control, which was demonstrated at the Chicago Exposition in 1955. A modified Hypro plano-milling machine is equipped with the latest Numeripath control system and is employed for 3-dimensional contour profiling. A 4-in. table type horizontal borer is arranged for Numeripoint control, and a radial drilling machine has a co-ordinate table controlled by the same system, which is also fitted to a vertical boring mill. (MACHINERY, 98—8/3/61.)

## The Use of Speed Factors in Calculating the Load Carrying Capacity of Helical Gears .. .. .. .. P. 545

In this article is discussed the necessity for accurately graded speed factor curves for use in connection with gear design formulae. It has been customary to use such factors to take account of the apparent stress-increasing effect of high speeds. The author points out that different factors are required for gears of different standards of accuracy, and suggests the segregation of gears into five grades. The influence of fatigue on the life of gears is considered, and the possibility of introducing separate fatigue factors for each grade is discussed. (MACHINERY, 98—8/3/61.)

## Making Metal Spectacle-frames .. P. 553

Some examples of press operations and bending equipment employed by the British American Optical Co., Ltd., are considered in this article. Gold-coated wire is employed for many spectacle frames, and many of the operations are performed by techniques designed to preserve this gold layer intact on the frame surfaces. These operations, examples of which are described, involve plastic deformation of the material to avoid cutting the gold layer. Lenses are held in straps, which are coined, skived on the rear face to separate them from the strip, fitted with rivets to retain three small leaf springs for stabilizing purposes, and bent to an asymmetrical U-shape. A two-stage press tool, employed for the leaf springs mentioned, has a positive-feed mechanism. Hand-operated bending fixtures are also described, for bending nose pad arms in three separate planes, also for forming the ear-loops on temple wires. (MACHINERY, 98—8/3/61.)

### Contributions to MACHINERY

If you know of a more efficient way of designing a tool, gauge, fixture, or mechanism, machining or forming a metal component, heat treating, plating or enamelling, handling parts or material, building up an assembly, utilizing supplies, or laying out or organizing a department or a factory, send it to the Editor. Short comments upon published articles and letters on subjects concerning the metal-working industries are particularly welcome. Payment will be made for exclusive contributions.

EDITORIAL

# Use of Aluminium in Motor Car Engines

Attention was effectively drawn to the rapid progress that has been made in the U.S.A. in connection with the applications of aluminium in motor car engines at a recent meeting of the Society of Automotive Engineers. Four of the papers presented at this meeting were concerned with engines in which aluminium is employed for major components, including, in each case, the cylinder block. Some of these engines are described in considerable detail, and the possibilities and limitations of aluminium in the field are competently discussed. Collectively, therefore, the papers constitute a most valuable survey, and only very brief mention can here be made of some of the points that are emphasized. The four units that are covered are as follows: the American Motors 6-cylinder in-line engine with pressure die cast block in A and B forms, the latter having been introduced without design restrictions associated with the need for using existing production equipment; the Chrysler "slant six" engine, the design of which was based, from the beginning, on the use of a pressure die cast aluminium block; the Oldsmobile Rockette V-8 engine for which the aluminium cylinder block is produced by the semi-gravity die casting process; and the Buick V-8 engine which, again, incorporates an aluminium block cast in a metal die with conventional sand cores.

Cast iron has become so well established as a cylinder block material and has proved so effective for the purpose, that organizations of the standing indicated would certainly not have contemplated a change to aluminium unless definite benefits to the user were foreseen. Obviously one of the principal advantages is the saving in weight that can be obtained, bearing in mind that with a lighter engine it is also possible to reduce the weight of other chassis components. In this connection it may be noted that the Buick engine, in which aluminium has been very extensively utilized—for example, for the cylinder heads as well as for the block—has a dry weight of 324 lb. for a displacement of 215 cu. in., or 1·5 lb. per cu. in. This latter figure, it is stated, is considerably lower than those for certain competitive "compact" car engines.

Aluminium blocks so far produced incorporate iron liners for the cylinders which are cast by the centrifugal process, and subsequently used as inserts. Such liners, it is pointed out, have better wearing properties than normally cast cylinder block iron, and it is claimed that excellent bonding is obtained between the outer surfaces and the aluminium, which ensures good heat transfer and low distortion. Effective cooling is another characteristic of the aluminium block, and for one of the new die cast units it has been possible to reduce the water capacity from 8 quarts to 6¼ quarts. Warming up is therefore more rapid, with improved heater performance and reduced engine wear on short runs.

Provided that engine quality can be maintained or improved—as appears to have been established—the future progress of aluminium engines will clearly be determined largely by the extent of the economies in production that they will permit. It is not yet clear whether the use of blocks produced by the semi-gravity die casting process is likely to become permanently established for larger engines or is merely to be regarded as a transition stage, pending further developments in connection with pressure die casting techniques and equipment. For smaller engines, as required for most European cars, however, there can now be little doubt that the future lies with pressure die cast cylinder blocks, and their introduction will evidently involve substantial changes in plant requirements. The inherent accuracy of die casting and the facilities which it affords, enable machining allowances to be considerably reduced, and many operations to be entirely eliminated by coring. For instance, in one cast iron block, the main oil gallery, of ⅝ in. diameter, is drilled for the full length in 12 stages. In the corresponding die cast block, the passage is cored and no machining is required. Apart from the fact that less material requires to be removed, moreover, aluminium can be machined at much higher speeds and feed rates than cast iron, and with less tool wear. Consequently, both cycle times and interruptions for tool changing are reduced, and fewer machines, with less labour and maintenance, are required to maintain a given output. Since the number of machines involved is not so great, moreover, changes in product design involve less capital outlay.

As an indication of the economies that may be obtained, the following examples may be noted. For a milling operation on a cast iron block during which a 4½-in. diameter cutter is traversed for a distance of 8½ in., the time required is 18 sec., whereas the corresponding time for a die cast aluminium block is 10 sec. On cast iron, the cutter

(*Continued on page* 565)

# A Brazilian Machine Tool Plant

## Methods and Equipment Employed for the Large Quantity Production of Lathes by Maquinas Agricolas Romi, S.A.

By P. A. SIDDERS, Chief Associate Editor

IN EARLIER ARTICLES in this series* devoted to the methods and equipment employed by Maquinas Agricolas Romi, Santa Barbara d'Oeste, Sao Paulo, Brazil, for the production of IMOR lathes, reference was made to the machining and grinding of beds, boring of headstocks and tailstocks, and other operations on various components. The layout and facilities at the Santa Barbara works were also considered, and a Romi-built forging press and air hammer, also a large Blanchard surface grinding machine, were described. Mention was made of the gear cutting and grinding department, and attention was drawn to the control arrangements for shaping and shaving cutters and hobs.

It was also explained that the tool, gauge, and drawing stores, is located centrally in the main machine shop, so that it is readily accessible to all sections. It may be noted here that statistical records are kept for all tools and cutters, similar to those maintained for gear cutting tools, and if a tool is broken in use, a report is submitted with the damaged tool when it is returned to the stores. All tools are prepared for use in the tool store. For example, cutter gangs are built up on milling machine arbors, and are stored on special racks, the type of lathes for which the gang is required being indicated by a label. The storage arrangements for tools generally are notably efficient, and Fig. 1 shows a corner of the stores with a rotating rack to hold the broaches used on the Oilgear 20-ton horizontal machine, referred to in the preceding article. The broach holder is located at one end of a rack that provides for the storage of lathe tools and boring bars, and has circular wooden bottom and intermediate supports, and a part-circular upper support. As may be seen, the shorter broaches are stacked vertically in holes in the bottom and intermediate supports, and the longer tools pass through holes in both the upper members. The three supports are mounted on a tubular steel spindle, which rotates on a central steel column, and access to the tools can be gained from either side of the main rack.

The company makes all the tipped lathe tools that are required, using tungsten carbide tips supplied by the Brazilian firm of Brassinter, and pro-

* MACHINERY, 98/116-18/1/61 and 98/292-8/2/61.

**Fig. 1. Part of the central tool, gauge and drawing stores in the main machine shop of the Romi plant, showing the rotating rack for broaches**

duces cartridge-type tipped boring tools, with micrometer adjustment, examples of which will be shown later.

At the Santa Barbara works, all limits and fits are based on the ISO system, and the company makes all the plug gauges needed. Gap gauges, however, are bought from an outside supplier. Gauges are inspected and checked for size every time they are returned to the stores after use, and a plug gauge is seen being checked with a Sigma comparator in Fig. 2. Details of the condition and size of each end of the gauge are recorded and filed. Other equipment in the gauge stores includes a Galileo machine for Rockwell hardness testing, and a Cary (Le Locle) comparator.

As would be expected, there is a well-equipped toolroom at the Romi plant, and for turning operations, type MVN and MVD lathes, made by the company, are installed. These machines have spindles mounted in Timken grade 00 to 0 taper roller bearings, and are guaranteed to turn within 0·005 mm. (0·0002 in.) maximum eccentricity. Other equipment in the toolroom includes a DeVlieg type 3B-48 Jigmil, a Société Genevoise type MP-4G jig borer, a Hurth type V10A jig borer and a Jones & Lamson optical projector. A Scharmann type FB 500 precision boring machine, with optical positioning arrangements, is shortly to be installed. Departments associated with the toolroom provide for cutter grinding, and for making multi-disc clutches and hydraulic pumps for incorporation in the company's machines.

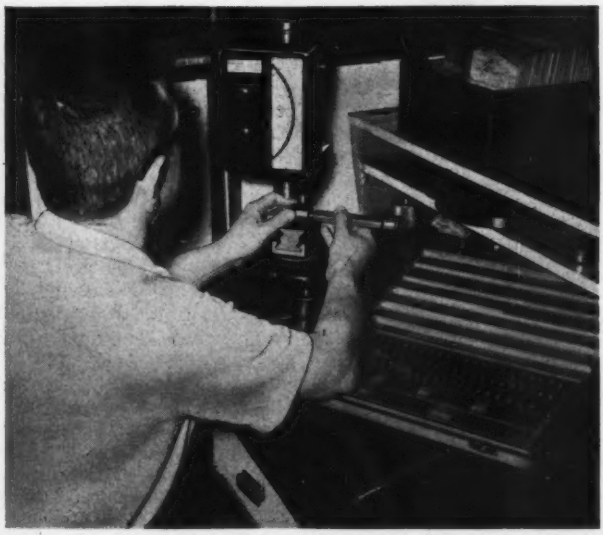


**Fig. 2. All gauges are checked each time that they are returned to the stores, and condition and size are recorded on cards. An inspector is here seen checking a plug gauge on a Sigma comparator**

## SPINDLE DEPARTMENT

Spindles for IMOR lathes are machined in a department that is housed in a building separate from the main machine shop. Most types of main spindles require a total of 20 operations, and for each type, the sequence is recorded on a progress card. There is a work sheet for each operation stage, including inspection,

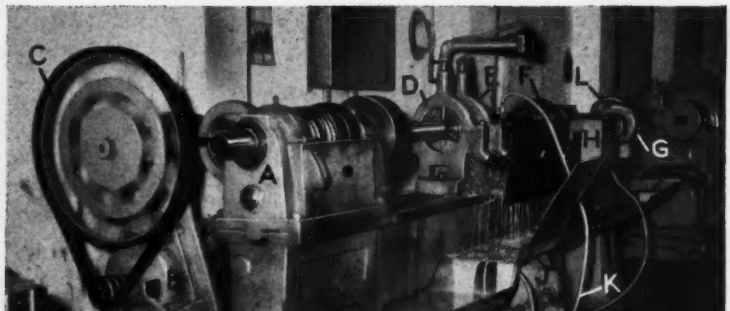



**Fig. 3. This deep-hole drilling machine has been built by the Romi company for producing holes in main spindles for IMOR lathes. A spade type bit is mounted in a tubular bar**

and this sheet gives details of the work to be done, also the speeds, feed rates and other cutting data.

A quality control check is carried out at 15 min. intervals.

Equipment installed in the spindle department includes a special Romi deep-drilling machine, a Newall cylindrical grinder adapted to provide an oscillating motion for the work, a Schaudt grinder for internal, external and facing operations, equipped for automatic size control, and a Lees Bradner thread-cutting machine. A Gleason bevel gear generator and an IMOR lathe fitted with a Burgsmuller thread-whirling head, for roughing operations on leadscrews, are also installed in the department, for convenience.

Fig. 3 shows the Romi deep-drilling machine for spindles, which provides for drilling holes up to 4 in. diameter. The machine is seen set up for a drilling operation on a spindle for a type MVN lathe, and similar spindles are just visible at the extreme left of the illustration. Each spindle is 800 mm. (31·496 in.) long, and is drilled 58 mm. (2·283 in.) diameter.

The deep drilling machine has a standard lathe bed, with a headstock *A* mounted at one end, and a drill-feed unit at the other. Drive to the headstock spindle is taken from a 7½ h.p. motor *B*, through a grooved pulley and twin V-belts, to a large-diameter flat pulley *C*. On the same shaft as the flat pulley there is a 4-step pulley, each step having two V-grooves, and the drive is transmitted by a second pair of V-belts to a corresponding 4-step pulley, co-axial with the headstock spindle. From the latter pulley, the spindle is driven through a back-gear, and speeds of 37, 53, 150 and 215 r.p.m. are obtainable. A 3-jaw chuck is secured to the spindle flange to hold the small end of the workpiece, and the other end is supported in a 3-point steady unit *D*. Each of the adjustable supports of this unit is fitted with a ball bearing. A second steady unit *E*, for supporting the drill, has adjustable plungers fitted with phosphor bronze pads.

For the deep-drilling operation, a spade-type bit of high-speed steel, with serrated cutting edges, is mounted on a tubular steel shank. The shank is carried in an adapter fitted to the end of a steel quill, which can slide but not rotate. A 2-t.p.i. thread is cut on the outside of the quill, and is engaged by the mating thread in a bronze nut, which is co-axial with the worm-wheel *F*, and keyed to it. Drive from a 3-h.p. motor *G*, mounted at the far end of the bed, is transmitted to a worm-reduction unit within the housing *H*. A transverse shaft from this unit is coupled to a second reduction gearbox at the rear of the bed, and the output shaft of this latter box is connected to the worm that meshes with the wheel *F*.

At the headstock end of the bed there is a reservoir unit for soluble-oil coolant, which is delivered by a pump, driven by the motor *J*, at a pressure of 120 lb. per sq. in. Coolant, fed by way of the flexible tube *K* to the tubular drill shank, is delivered through holes in the drill bit, and passes back along the drilled hole, carrying the swarf with it. At the end of a drilling operation, the driving motor is switched off, and the drill is withdrawn by traversing the quill manually by means of the wheel *L* at the far end. For drilling the spindle shown, the work is run at 150 r.p.m., and the drill is fed at a rate of 0·0079 in. per rev.

A deep-hole trepan-boring machine has been designed by the company, and is now being built. This machine will have capacity for boring holes of 8 in. diameter, and will facilitate machining of the spindles for the larger IMOR lathes.

### GRINDING SPINDLE-GEAR BEARING PADS

On each spindle for an IMOR type MVN lathe there are three equally-spaced splines, whereon is mounted a sliding gear. The internal splines of the gear are of "bottom fitting" type, and between the splines on the spindle there are bearing pads which are engaged by the crests of the splines in the gear. Both the splines and pads on the spindle are milled, after the spindle has been deep-drilled and bored, and the arcuate surfaces of the bearing pads are finished by grinding on the specially-adapted Newall cylindrical machine, to which brief reference has already been made. Grinding is performed by oscillating the work through a small angle, and a truly arcuate surface is produced without the use of formed grinding wheels.

Fig. 4 shows a spindle for an MVN lathe set up on the Newall machine, which is of plain 10- by 36-in. L type. An abrasive wheel of 20 in. diameter is employed, and the spacing of the bearing pads and splines on the workpiece, and the widths of the pads and associated clearance grooves, are such that the pad surfaces can be ground without interference between the wheel and the splines.

The spindle *M*, to be ground, is mounted between dead centres in the machine work-head spindle and tailstock quill, and oscillating motion is imparted to it by means of a special driving arrangement on the work-head spindle. A steel disc *N* is mounted on the face of the work-head spindle, eccentric to the centre point, and is secured by two screws which pass through slotted holes, so that the amount of eccentricity can be adjusted. Surrounding the disc there is a frame *P*, with an extension at one side, and this extension has a slot which engages a peg projecting from the plate *R* secured to the work-head. As the eccentric disc rotates with the work-head spindle, the frame *P* is caused to rock, due to the restraint imposed by the engagement of the slot in the extension with the peg in the plate *R*.

A flanged steel sleeve is mounted on the small end of the spindle, and is secured by means of a screw. The driver *S* is a running fit on the body of the sleeve, and has an arm extending from one side. There is a radial screw in the driver which can be engaged with any one of three holes in the sleeve, these holes being spaced at 120 deg. intervals, to provide for indexing the spindle for grinding the three pads. A slot is machined in the arm of the driver, and is a sliding fit on a bronze slipper pad, which is mounted on a pin projecting from the eccentric frame *P*, opposite to the extension. The arrangement is such that, as the work-head spindle is driven, the rocking motion of the frame is imparted to the driver, through the pin and slipper pad, so that the lathe spindle to be ground is oscillated.

For grinding the type MVN lathe spindle shown, the work-head spindle is run at 52 r.p.m., the work making a corresponding number of oscillating cycles per min., and the grinding wheel speed is 1,250 r.p.m.

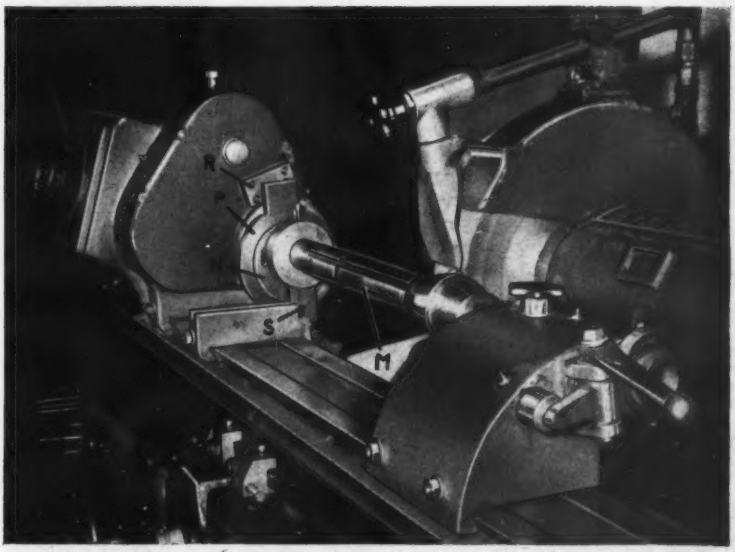



**Fig. 4. This Newall plain 10- by 36-in. L type machine has been fitted with special driving arrangements to oscillate the work for the finish grinding operation on bearing pads between the splines**

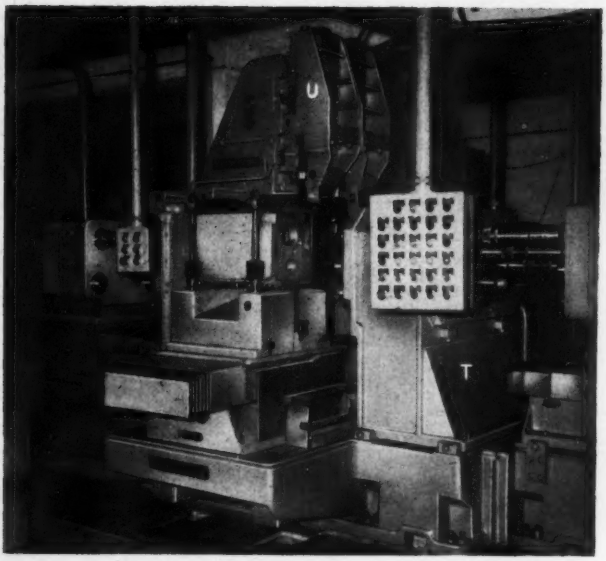



**Fig. 5. A view of the special Oerlikon Italiana machine for drilling and boring headstocks and other units for certain IMOR lathes. The machine has three spindle units and two vertical slides that carry steady bushes**

## SPECIAL OERLIKON ITALIANA BORING MACHINE

In the preceding article, reference was made to a Romi-built machine for boring the headstocks and tailstocks of certain lathes. The company has recently installed a special machine with three heads for boring headstocks, tailstocks, aprons and feed gearbox casings for type MIN and MID lathes, also some components for type NTCN and NTPN lathes. This machine, seen in the heading illustration, was built by Oerlikon Italiana, to Romi specification, and has enabled machining times to be substantially reduced. For roughing, semi-finishing and finishing operations on type MIN headstocks, for example, the floor-to-floor time has been reduced to only 12½ per cent of that previously required, and these operations will be considered in detail later.

The machine is roughly T-shaped in plan, and guideways for a traversing work-table extend along the "upright" and across the "cross-bar" of the T-form. These guideways project beyond the "cross-bar" and are supported by a cantilever extension at the front of the base. Fixtures of various types, to suit the different workpieces, can be mounted on the table, and loading or unloading is carried out with the table on the projecting portion of the guideways. A fixture is seen at the loading station in the heading illustration, also in Fig. 5. The table and fixture can be moved from the loading station to a second station in line with the "cross-bar" of the T-form, or to a third station on the "upright." Motion is imparted to the table hydraulically, under electrical control, and the arrangements are such that the table is moved at a rapid traverse rate to a position beyond that required, then returned slowly until it engages a stop. Once it has been set correctly at each station, the table is hydraulically clamped.

Unit construction has been employed for the Oerlikon Italiana machine, and at either side of the main base, which supports the table, there is a wing base, each with a slide unit and a machining head, and these wing bases form the "cross-bar" of the T-shape. Each wing base, slide and head assembly is a self-contained unit, with its own hydraulic power supply, and a 2-speed, 6/9-h.p., motor for driving the head spindles. The slide unit has two rectangular-section guideways, which, like those for the table, are protected by telescopic sheet-metal covers. Movement of the head on the slide is effected hydraulically, under electrical control. A similar head, slide and wing-base assembly is mounted in line with the main base, at the rear of the machine. As viewed in the heading illustration, the head at the left is designated No. 1, the head at the right, No. 2, and the head at the rear, No. 3.

## TAPER-BEARING FINE-BORING QUILLS

Each machining head is of multi-spindle design, and there are seven spindles in head No. 1, six in head No. 2 and eight in head No. 3. The boring and other tools employed are not mounted directly in these spindles, but in quill assemblies carried in massively-constructed brackets, two of which are secured to the main base between each head and the table guideways. The bracket for head No. 2 is indicated at *T* in Fig. 5, and a similar unit is provided for head No. 3. This latter unit is mounted on raising blocks at either side of the base, so that the table can pass beneath it. The quill unit for head No. 1 is of generally similar construction, but has seating faces on its top surface, whereon two hydraulically-operated vertical-slide units are

mounted, as are seen at *U* in Fig. 5. There are two such units, and the slide of each has a T-slotted lower horizontal face, to which is bolted and keyed a bracket carrying a steady bush. Fig. 6 is a close-up view of the machine from the rear, and the two vertical slides and steady brackets may be seen. Each slide can be traversed independently by hydraulic power, to positions controlled by an adjustable stop, and the steady bush brackets can be interchanged to suit the different workpieces.

It was specified by Romi that all quill assemblies —even those for the smallest holes—should incorporate spindles mounted in Timken taper-roller bearings. This stipulation was based on experience gained in connection with boring operations at the Santa Barbara plant, the Romi company having developed a precision fine-boring quill unit of this type, in which the spindle forms the inner races of the bearings. It was also stipulated by Romi that the total geometrical error of any hole should not exceed 0·003 mm. (0·00012 in.), and that no "through-type" conventional boring bars should be used, but that all holes should be machined with "stub-type" tools.

Each quill assembly slides in liner bushes in the associated support bracket, and the outer sleeve of the assembly does not rotate. The spindle of each quill has a steep taper socket and an external thread at one end, and a transverse key and external thread at the other. It will be appreciated that all the head spindles and quill assemblies are not used for boring each type of workpiece. The spindles and quills that are to be employed are coupled together by connecting shafts, which engage the keys on the quill spindles and are secured to these spindles by internally-flanged ring nuts. Each of the connecting shafts comprises two principal members, screwed together, to permit adjustment for length, and not only are the quill spindles driven by the spindles of the machining heads, but axial motion is imparted to the quill units.

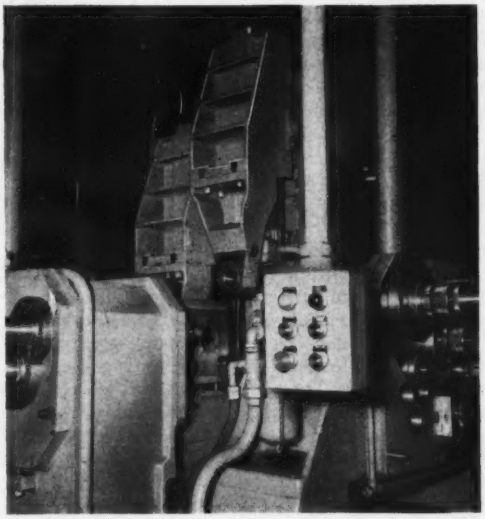


**Fig. 6. Close-up view of the Oerlikon Italiana machine showing one of the vertical slides in its lower setting. The boring tools are not mounted directly in the spindles of the machine, but are fitted to sliding quills, in massive brackets**

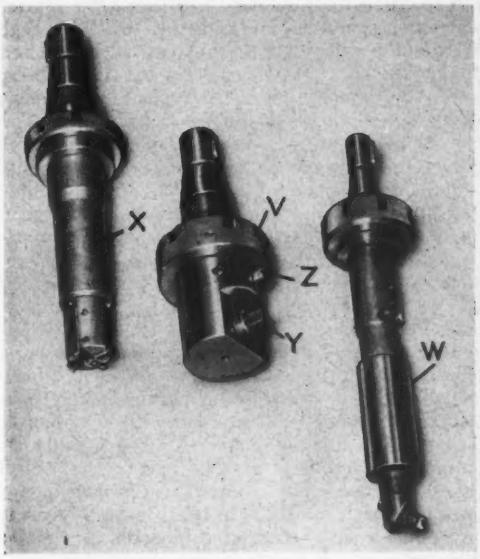



**Fig. 7. Typical boring and core-drilling tools used on the Oerlikon Italiana machine. Cartridge-type carbide-tipped tool bits, with micrometer adjustment, are extensively employed**

### BORING TOOLS

Typical tools employed on the Oerlikon Italiana machine are seen in Fig. 7. Each tool has a ground steep-taper shank to fit the boring quill, and a key to transmit the drive. A flanged ring nut, as at *V*, engages the thread on the quill spindle, to secure the tool in place. Where necessary, a rotating steady sleeve, mounted on needle roller bearings, is fitted, as indicated at *W*, and engages the bush in one of the vertically-sliding steady units.

The three tools shown form part of a set for machining operations on headstocks for IMOR type MIN lathes, which will subsequently be considered in detail. At *X* is seen a tool for core-drilling, which is fitted with four replaceable blades, each with a brazed-on tungsten carbide tip. The bar at the right incorporates two cartridge-type boring tools, as made by Romi, each tool being of the angular mounting form. A similar cartridge tool is seen at *Y* in the central bar, but is designed for mounting perpendicular to the bar. Both types of tools have tungsten carbide tips, and micrometer adjustment. The central bar is also provided with a conventional tool bit *Z*, for a counterboring operation.

The Oerlikon Italiana machine operates on a semi-automatic cycle, after the work has been loaded and the "start" push button on the main control panel has been pressed. Each motion of the machine can be engaged independently, if required, by means of push buttons on the central panel, and separate panels are provided for operating each head. Electrical control gear is housed in a floor-mounted cabinet to the left at the rear, and all electrical connections are made by way of overhead ducting.

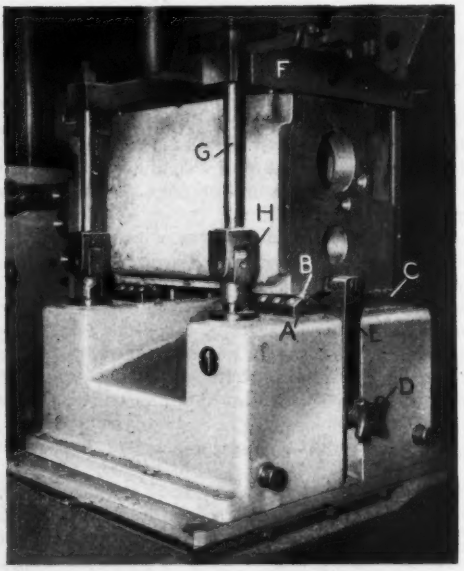



**Fig. 8. The fixture for the headstocks of IMOR type MIN lathes. Location is taken from the surfaces whereby the casting is positioned on the bed in the final assembly**

## MACHINING TYPE MIN HEADSTOCKS

In Fig. 5 and 6, the machine is seen set up for operations on headstocks for type MIN lathes, with the table in the loading position. Fig. 8 is a close-up view of the fixture and workpiece, the headstock casting being loaded with its front face towards the rear of the machine.

The fixture has a box-type cast iron base, which is keyed and screwed to the table seating face. Two steel blocks, as at *A*, are screwed and tenoned to the upper surface of the fixture base, at the front, and each is of prismatic section, with an accurately finished V-groove in the top face. A hardened and ground roller, as at *B*, is fitted in each V-groove, and is retained in position by a screw. At the rear of the fixture base there are two other steel blocks as at *C*, each of which has a flat upper surface, with diagonal grooves for swarf clearance.

Before the headstock castings are delivered to the machine, the base and top surfaces are ground on the large Blanchard machine described in the preceding article, and the front and the two end faces are milled. An inverted-V groove is machined in the base, and when the headstock is assembled to the lathe bed, this groove engages the rear V-guideway, and the flat surface of the base rests on the flat front guideway. The headstock is located in a similar manner on the fixture on the Oerlikon Italiana machine, the V-groove of the headstock engaging the rollers at the front of the fixture, and the front portion of the base resting on the grooved blocks at the rear of the fixture.

Resting on these rollers and blocks, the headstock casting is thrust endwise by means of the hand nut *D* and lever *E*, until it abuts a fixed screw stop at the opposite end of the fixture. It is then secured by means of the two strap-type clamps shown. Each clamp incorporates a bar *F*, which is pivoted on a pillar at the rear of the fixture base. A yoke-piece is mounted on a transverse pin that passes through a recess machined in the bar *F*, and has circular pads at either end that bear on the top face of the headstock casting, at the corners. The clamp is secured by a nut on a stud *G*, which is free to swing sideways on a pivot *H*, and the bar *F* is slotted to allow the stud to be moved downwards clear of the work area, for loading.

## MACHINING SEQUENCE

A machined headstock casting is seen in Fig. 9, with the front face to the right. To facilitate identification in the following description, the face to the left in the illustration will be referred to

as the left-hand end, and the opposite face, as the right-hand end. The operations are performed in three stages—roughing, semi-finishing, and finishing—and each stage is completed on a batch of parts to allow the components to cool before further machining is carried out, also to reduce tool changing and re-setting. At the time of our visit, headstocks for MIN lathes were being machined in batches of 150, but the batch quantity is to be increased when all the new equipment that the company has planned to install is in operation.

For each machining stage there are three phases, and with the headstock casting located and clamped as described, the table is moved to station No. 1, for the first roughing phase. Heads No. 1 and 2 are then advanced, and the main spindle bearing housings *J* and *K*, in the right- and left-hand ends respectively, are bored with single-point tools. Feed rates of 0·015 in. per rev. are employed for seating *J*, which is bored to 111 mm. (4·370 in.) diameter at a speed of 196 r.p.m., and of 0·013 in. per rev. for seating *K*, which is bored to 96 mm. (3·780 in.) diameter, at 228 r.p.m. At the same time, an internal projection in the casting is machined to 40 mm. (1·575 in.) radius, for clearance purposes.

When the heads have been withdrawn, the table is moved to station 2, for the second phase of the roughing stage. Heads No. 1 and 2 are again advanced, and the front vertical slide is moved down, although the steady bush is not used for this phase. A hole for the feed reverse gear shaft is drilled 27 mm. (1·063 in.) diameter in the left-hand end, as indicated at *L*, and a hole for the same shaft is drilled 21 mm. (0·827 in.) diameter in the intermediate wall *M*, with a stepped drill driven by head No. 2. The drill is run at 250 r.p.m. and the feed rate is 0·012 in. per rev. At the same time, a combination boring bar and tungsten carbide tipped drill, driven at 460 r.p.m. by head No. 1, is fed at a rate of 0·006 in. per rev. to machine holes for the secondary layshaft to 50·7 mm. (1·996 in.) in the right-hand end, as indicated at *N*, and to 45·7 mm. (1·799 in.) diameter in the intermediate wall.

The table is next advanced to station 3, for the third phase, and the second (rear) vertical slide is moved down. A multiple tool, driven by head No. 1, machines the hole *P* for the input shaft to 74 mm. (2·913 in.) and 70·7 mm. (2·783 in.) diameter in the right-hand end of the casting; and to 60·7 mm. (2·390 in.) diameter in the intermediate wall *M*. For this operation, the tool is supported by a steady bush, carried by the vertical slide, which is positioned between the right-hand end and the intermediate wall. The tool is driven at

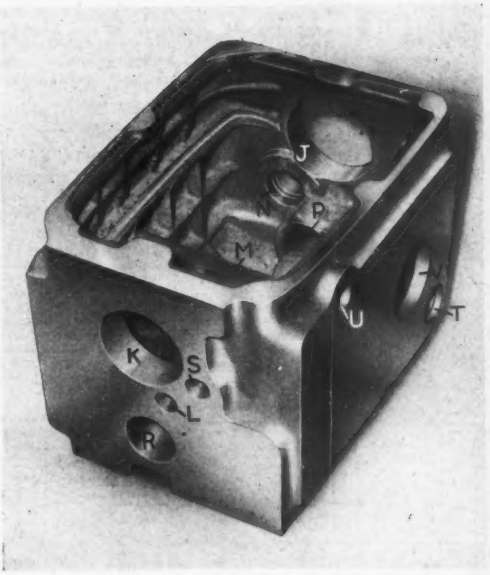



**Fig. 9. The headstock of a type MIN lathe, showing the various holes that are rough, semi-finish, and finish machined in three stages on the Oerlikon Italiana machine**

334 r.p.m., and is fed at the rate of 0·009 in. per rev. At the same time, tools driven by head No. 2, drill a hole *R* for the input shaft, in the left-hand end, to a diameter of 61·7 mm. (2·429 in.), and a hole *S* for an intermediate shaft for the gearbox drive, to 27 mm. (1·063 in.) diameter. For the hole *R*, the speed and feed are 400 r.p.m. and 0·007 in. per rev., and for the hole *S*, 250 r.p.m. and 0·012 in. per rev.

With the work at the same station, drills driven by head No. 3 produce a blind hole of 37 mm. (1·457 in.) diameter at *T*, and a through hole of 30 mm. (1·181 in.) diameter at *U*, in the front face. Hole *T*, for an oil level indicator, is drilled at a speed of 460 r.p.m. and a feed rate of 0·006 in. per rev., and hole *U*, for the shaft for the reversing gear shift lever, is drilled at 250 r.p.m., and 0·012 in. per rev. Simultaneously with these drilling operations, the hole *V* for the main gear-shift lever assembly is bored to 92·7 mm. (3·650 in.) diameter, at a speed of 240 r.p.m., and a feed of 0·012 in. per rev. When the three heads and the vertical slide have been withdrawn, the table is returned to the front of the machine, for unloading. The cycle time for this stage is 3 min., and approximately 1¼ min. is allowed for loading and unloading.

Details of the operations performed, speeds and feed rates employed, and the dimensions maintained at the finish-boring stage on headstocks for IMOR type MIN lathes, performed on the special Oerlikon Italiana machine

| Station No. | Head No. | Operation | Diameter (mm.) | Diameter (in.) | Tolerance (mm.) | Tolerance (in.) | Speed (r.p.m.) | Feed rate (in. per rev.) |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Bore hole *J** | 112·4 | 4·4252 | To suit Timken flange type bearing | | 294 | 0·0033 |
| | | Counterbore hole *J*, 0·3 mm. (0·012 in.) deep, ±0·05 mm. (±0·002 in.) | 118 | 4·6456 | | | | |
| | 2 | Bore hole *K* | 97·3 | 3·8307 | To suit Timken flange type bearing | | 342 | 0·0029 |
| | | Counterbore hole *K*, 0·3 mm. (0·012 in.) deep, ±0·05 mm. (±0·002 in.) | 103 | 4·0551 | | | | |
| 2 | 1 | Bore hole *N* | 52 | 2·0472 | +0·018 −0·012 | +0·0007 −0·0005 | 690 | 0·0014 |
| | | Bore hole in intermediate wall | 47 | 1·8504 | +0·014 −0·011 | +0·0006 −0·0004 | | |
| | 2 | Bore hole *L* | 28 | 1·1024 | +0·021 −0 | +0·0008 −0 | 750 | 0·0130 |
| | | Bore hole in intermediate wall | 22 | 0·8661 | +0·021 −0 | +0·0008 −0 | | |
| 3 | 1 | Bore hole *P* | 72 | 2·8347 | +0·018 −0·012 | +0·0007 −0·0005 | 500 | 0·0018 |
| | | Bore hole in intermediate wall | 62 | 2·4409 | +0·018 −0·012 | +0·0007 −0·0005 | | |
| | 2 | Bore hole *R* | 63 | 2·4803 | +0·030 −0 | +0·0012 −0 | 600 | 0·0017 |
| | | Bore hole in intermediate wall | 28 | 1·1024 | +0·021 −0 | +0·0008 −0 | 750 | 0·0013 |
| | 3 | Bore hole *T* | 50 | 1·9685 | +0·039 −0 | +0·0015 −0 | 690 | 0·0014 |
| | | Bore hole *U* | 31 | 1·2205 | +0·025 −0 | +0·0010 −0 | 750 | 0·0013 |
| | | Bore hole *V* | 94 | 3·7008 | +0·035 −0 | +0·0014 −0 | 360 | 0·0027 |

* All letter references correspond to those in Fig. 9

All tools are changed for the semi-finishing stage, which follows a generally similar sequence. At station 1, the holes *J* and *K* are bored with single-point tools to 112 and 97 mm. (4·409 and 3·819 in.) diameter respectively. The speed and feed rate for hole *J* are 196 r.p.m. and 0·010 in. per rev., and for hole *K*, 228 r.p.m. and 0·009 in. per rev.

At station 2, hole *N* is opened out to 51·7 mm. (2·025 in.) diameter, and the corresponding hole in the internal wall *M* to 46·7 mm. (1·839 in.) diameter, with a boring bar with two bits, which is run at 460 r.p.m., and fed at 0·004 in. per rev. This bar, which is supported by a steady bush in the front vertical slide, also carries a tool bit for forming a circlip groove, 2 mm. (0·079 in.) wide by 55 mm. (2·165 in.) diameter, in the hole *N*. The tool is fed radially, after the completion of the boring traverse, by a cam within the bar.

At the same station, a boring bar with two cutting bits, driven by head No. 2, machines the previously drilled hole *L* in the left-hand end, also the corresponding hole in the intermediate wall *M*, to 27·7 and 21·7 mm. (1·091 and 0·890 in.) diameter, respectively. The tool is run at 500 r.p.m., and fed at 0·004 in. per rev.

When the work has been advanced to station 3, the smaller step of the hole *P* is bored to 71·7 mm. (2·823 in.) diameter, and the corresponding hole in the intermediate wall, to 61·7 mm. (2·429 in.) diameter, by two tool bits in a single bar, which is run at 334 r.p.m., and fed at 0·006 in. per rev. This bar is driven by head No. 1, and it incorporates cam-operated tools for machining a circlip groove in each hole. Each groove is 2·5 mm. (0·098 in.) wide, and the groove in hole *P* is 75 mm. (2·953 in.) diameter, and the other, 65 mm. (2·559 in.) diameter.

Tools driven by head No. 2, bore hole *R* to 62·7 mm. (2·469 in.) diameter, at a speed of 400 r.p.m., and a feed of 0·005 in. per rev.; also hole *S* to 27·7 mm. (1·091 in.) diameter, at a speed of 500 r.p.m. and a feed of 0·004 in. per rev.

The hole *T* is machined to step form by two tool bits in a bar driven by head No. 3. One step diameter is 49·7 mm. (1·957 in.), and the other is 38 mm. (1·496 in.). The bar is run at 460 r.p.m., and is fed at 0·004 in. per rev. Hole *U* is bored to 30·7 mm. (1·209 in.) diameter, at a speed of 500 r.p.m., and a feed of 0·004 in. per rev., and hole *V* is opened out to 93·7 mm. (3·689 in.) diameter, at a speed of 240 r.p.m. and a feed of

0·008 in. per rev. The machine cycle time for the semi-finishing stage is 1 min. 50 sec.

A generally similar sequence is followed for the finish boring stage, and the operations performed, the sizes maintained, and the speeds and feed rates employed, are given in the accompanying table. The tools driven by head No. 1 at stations 2 and 3 are supported by bushes in the overhead steady units, and counterboring operations are performed at both ends of the headstock at station 1, to suit the flange-type Timken bearings fitted to the MIN lathe. The machining cycle time is 1 min. 15 sec. for the finish boring stage.

A further article concerned with the practice of Maquinas Agricolas Romi, S.A., will be published shortly in MACHINERY.

# Mahr Vernier Caliper Gauge for Measuring Hole Centre Distances

The Centri-Meter vernier caliper gauge shown in Fig. 1 has recently been introduced by Carl Mahr, Esslingen am Neckar, Germany, for quickly measuring the centre distance between two holes which may be of the same or different diameters.

In use, the left-hand jaw is set in contact with a stop at the extreme end of the scale, and the right-hand jaw is moved towards it until the measuring anvils have been brought into contact with the bores at the point of minimum distance between the holes, as shown in the diagram at *a* in Fig. 2. When the anvils have been brought clear of the bores, the left-hand jaw is moved into contact with the right-hand jaw as seen at *b*. The left-hand jaw is now secured to the scale by means of a knurled-head screw, no reading being taken at this stage.

Next, the anvils are passed into the bores, and the right-hand jaw is moved to the right as far as possible. The anvils now make contact with the bores at points which are farthest apart, as indicated at *c*. The distance between the graduations on the scale is twice that indicated by the numbers, and the reading obtained corresponds to the centre distance between the holes. The vernier scale on the right-hand jaw gives readings to 0·02 mm. (0·0008 in.).

Henry Pels & Co., Ltd., 32-28 Osnaburgh Street, London, N.W.1, are the distributors in this country for Carl Mahr measuring equipment.

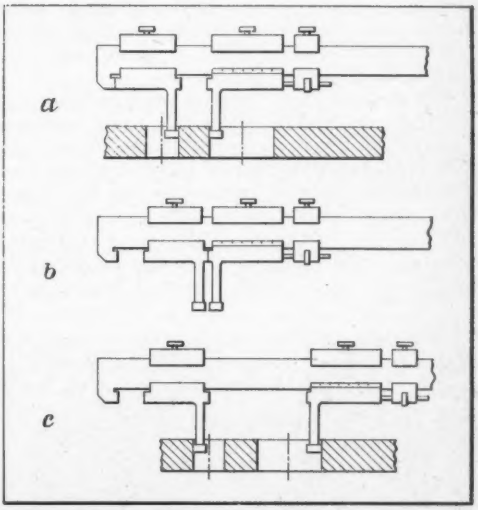



**Fig. 2. Diagrams showing the method of measuring centre distance with the Centri-Meter vernier caliper**

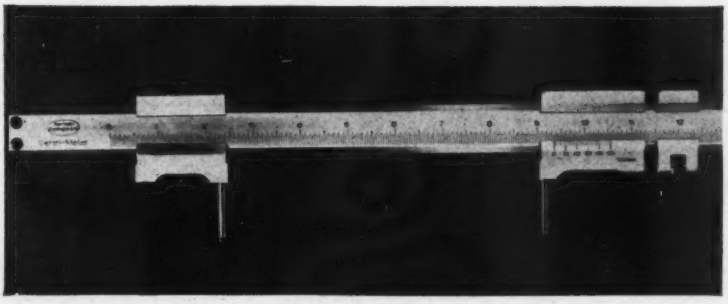


**Fig. 1. Mahr Centri-Meter vernier caliper gauge for measuring the centre distance between holes**

# Producing Rotors for Gas Test Meters

By S. C. POULSEN, Associate Editor

THE RANGE OF INDUSTRIAL equipment manufactured by Parkinson Cowan Industrial Products, Dolphin Works, Fitzalan Street, Kennington Road, London, S.E.11—a division of Parkinson Cowan, Ltd.—includes Parkinson-Schwank gas-fired radiant space-heating appliances; gas-fired infra-red paint-drying and other heat process plant; paint-shop plant and installations; and a range of "wet" and "dry" laboratory gas test meters.

The various "wet" meters produced comprise types A., B. and E.40, which have maximum capacities of 20 cu. ft. (or 500 litres), 10 cu. ft. (or 250 litres) and 40 cu. ft. (or 1,000 litres) per hour. These instruments all operate on the Hyde principle, which involves the use of a rotor with helical measuring compartments. The type A instrument, with the outer housing removed, to show the arrangement of the rotor, is seen in Fig. 1, and a

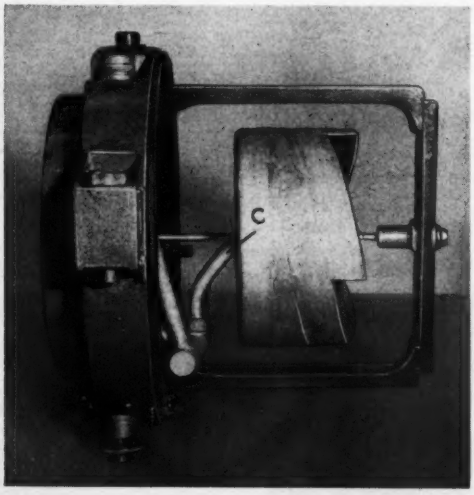
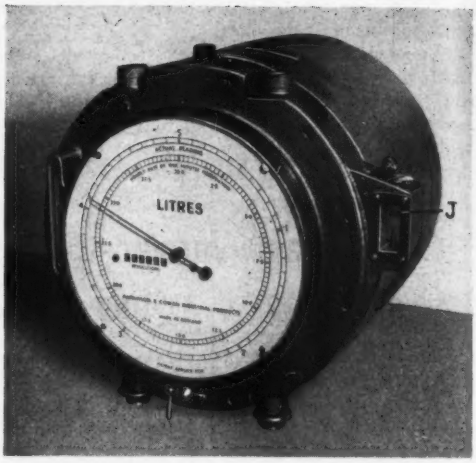



**Fig. 1. Type A laboratory gas test meter, with outer housing removed, showing the measuring rotor and outlet pipe**




complete instrument in the heading illustration. Two type A rotors, viewed from opposite ends, are shown in Fig. 2. As may be observed, the rotor is in the form of a hollow cylindrical drum with four internal helical vanes. These vanes are equally spaced, and each is of 270 deg. angular extent. At the inlet end, the spaces between the vanes are open, whereas at the outlet end, they are enclosed by the domed cover *A*, which has a central aperture *B*.

In the assembled instrument, the rotor and spindle are mounted horizontally, as seen in Fig. 1, and the housing is filled with water to such a level that the spindle and the upper edge of the aperture *B* are submerged. The gas to be measured is admitted to the space above the water, through an inlet connection in the housing. Internally, the outlet connection terminates in an upwardly-curved pipe *C*, that passes through the aperture *B*, and projects above the water-level inside the domed cover. A pressure differential is thus established across the measuring compartments, along which gas and water are thereby urged, with the result that the rotor revolves. Meanwhile, the water entraps gas in each compartment in turn, and this gas is released into the domed cover *A*, whence it passes through the outlet pipe *C*. The rate at which the rotor revolves therefore depends on the volumetric capacity of the portions of the compartments that emerge above the water-level, and the volume of gas that passes through them in a given time.

The rotor of the type A meter has a total volumetric capacity of 0·02 cu. ft. (or 0·5 litre) per rev., and the accuracy of the readings is maintained within ±0·1 per cent over the entire working range,

corresponding to rotor speeds from practically zero to 1,000 revolutions per hour. It will be apparent that the dimensions of the rotor, and in particular, the spacing and helix-angle of the measuring compartments, must be correspondingly accurate. Similarly, to ensure freedom from cyclic errors, eccentricity of the rotor/spindle assembly must be kept to a minimum, and the assembly must also be statically balanced.

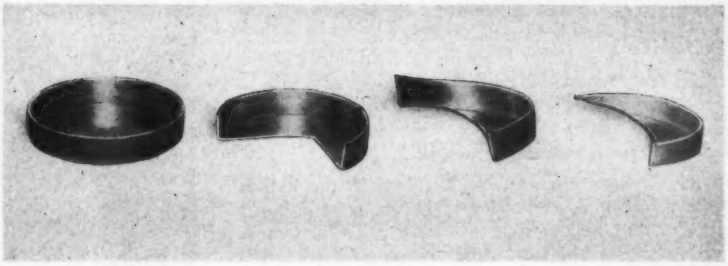


**Fig. 3. Stages in the production of the flanged helices from 24-s.w.g. spun copper blanks, of 6¾-in. diameter**

## PRODUCING THE ROTORS

The main body of the type A rotor is built-up from four flanged helices of 24-s.w.g. copper, that are plated with nickel and tin to resist corrosion. These helices are soldered together by the flanges, the edge of one flange slightly overlapping the "heel" of the next, to form a continuous outer wall. To assist location during assembly, and to present a smooth external surface, each heel portion is joggled to accommodate the thickness of the overlap. These helices are produced from spun blanks of 6⅝ in. diameter by 1¼ in. deep by the stages shown in Fig. 3.

A 90-deg. sector with a corner-radius is first cut from each blank, and the latter is then set to the required helical and joggled form on a fly-press, with the tools shown in Fig. 4. Since the overall height of these tools exceeds the "daylight" of the press, they are arranged beneath the table, and the punch portion is connected to the ram by means of an extension *D*, which passes through the table aperture. As may be observed, the bottom face of the punch body is in the form of a helix, against which the blank is initially located by a helical groove in the pilot *E*. The lower tool comprises a fixed outer cylindrical member, and a concentric inner member which is free to slide, and is supported on a rubber cushion. Each of these members has a helical contour on the upper face, complementary to that of the punch.

When the press is operated, the flat portion of the work is gripped between the upper and lower tools, and thrust downwards, against the pressure of the rubber cushion, into the bore of the fixed outer member. The flange is thus constrained against the punch, and the helical portion held to contour. Towards the end of the stroke, the joggle is formed by a helical shoulder in the bore of the fixed member, in conjunction with a corresponding step on the punch, and the inner moving member is arrested by a stop. With this arrangement, both the joggle and helix are accurately set. When the ram is raised, the rubber cushion serves to eject the formed work.

Before the helices are assembled, they are trimmed to size. A helical marking-off template is used to facilitate the scribing of all edges,

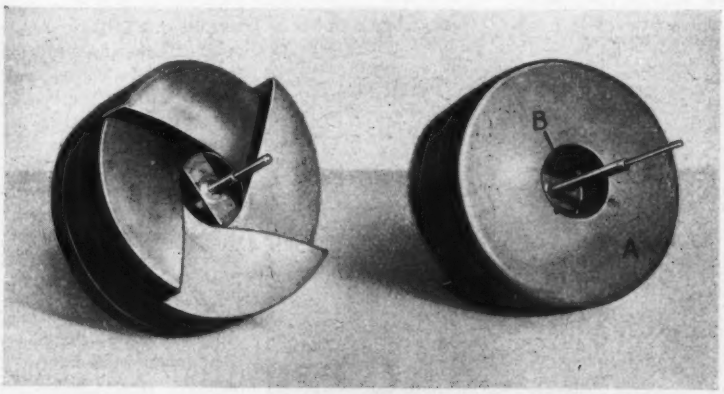



**Fig. 2. Type A measuring rotors, viewed from opposite ends. A domed cover *A* is provided at the outlet end**

including the flange taper at the outlet end, and the surplus is trimmed off with snips. The work is then plated by the Nickelex and electro-tin processes, after which it is trued in the same press-tools, to remove any distortion caused by handling.

### SOLDERING FIXTURE

The helices are soldered together in the fixture shown in Fig. 5, in which the spacing is maintained by the four helical steel sectors *F*. These sectors are secured to the base of the fixture by screws, and the gaps between them will just accommodate the thickness of the work. The component helices are inserted in these gaps with a "screwing" action, which is automatically arrested with the flanges overlapping correctly, and with the inlet edges equally spaced at 90 deg. A cylindrical sleeve *G* is located in the centre of the assembly by the inner edges of the fixture segments, and is subsequently soldered to the inner edges of the helices. Access for this purpose is afforded by semi-circular cut-outs in the fixture segments.

Soldering of the flange-joints is carried out in the conventional manner, and the domed cover *A*, Fig. 2, is soldered to the assembled rotor body before the latter is removed from the fixture. Removal of the assembly is effected by "unscrewing" it from the locating elements. Next, the spindle is passed through holes in the diametral members *H*, Fig. 5, incorporated in the central sleeve, and soldered in position, and the work is then statically balanced with the spindle resting on horizontal knife-edges. Subsequently, the working characteristics of the rotors are carefully checked during the calibration of the assembled instruments, at which stage the water-level is adjusted to give the required volumetric capacity of each rotor. Once the correct level is established, a datum pointer in the sight-glass *J* (heading illustration) is set accordingly, and thereafter, the water-level is checked by reference to this pointer.

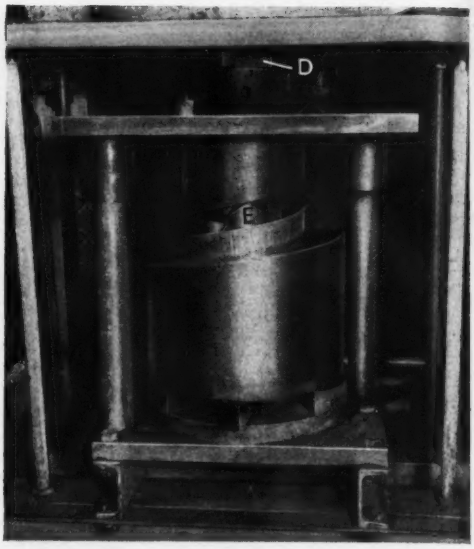



**Fig. 4. The tools here shown set up beneath the table of a fly-press, are employed for setting the helices and joggling the flanges**

### MACHINING THE HELICAL TOOLING ELEMENTS

The construction of the various items of tooling described entailed the production of a comparatively large number of accurate helical surfaces. In the absence of suitable profile-generating equipment for machining these surfaces, the following technique was adopted. Two triangular templates were prepared from sheet metal, which

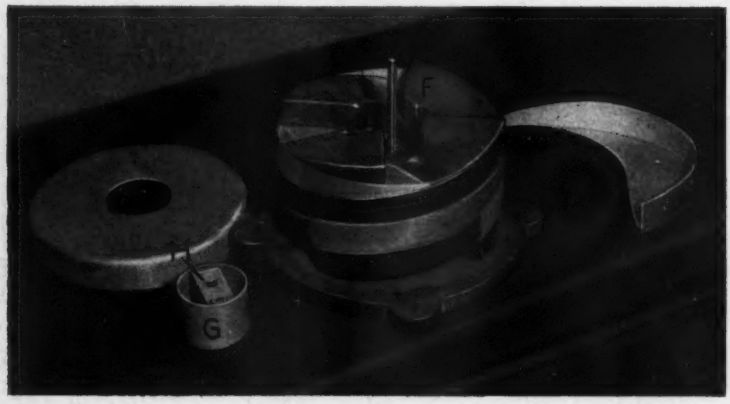



**Fig. 5. The fixture here shown, which incorporates four helical locating sectors, is employed for soldering the rotor components.**

represented the helix-angles at the inner and outer edges. Each template was rolled to the appropriate diameter, and one was mounted concentrically within the other, in the correct angular and axial relationship. The space between them was filled with lead, the surface of which was trued level with the edges of the templates, so that radially, at all positions, it was accurately square to the longitudinal axis.

This model was used as a pattern for an iron casting, which, after the helical surface had also been smoothed and trued by hand, served as a master for all subsequent machining. The various tooling elements were also cast to the approximate profile, from similar patterns, and were then machined on a shaper, from the master, by the following method. A rigid mandrel, on which the bore of the master was an accurate sliding fit, was mounted vertically on the machine table. The master was placed over the mandrel with the flat base uppermost, and the helical face downwards. This face was supported by a steel ball, housed in a recess in the top of a vertical post, also secured to the table. Thus, when the master was rotated, it was raised or lowered in accordance with the pitch of the helix.

The first components to be machined were those for the press-tool. For this purpose, the flat base of the piece was dowelled to that of the master, so that the helical face was uppermost, and this face was then machined with a sharp vee tool. This tool was arranged so that the stroke was truly radial with respect to the axis of the mandrel and work, and an accurate helical surface was generated by indexing the master and work manually, at each stroke. When the punch portion of the press-tool had been machined in this manner, it was used as a jig for machining the four helical sectors for the soldering fixture (*F*, Fig. 5). Each sector in turn was screwed to the helical face of the punch, machined on one side, turned over, and machined on the opposite side. In this manner, the sectors were machined to the correct helical profile and thickness. The same technique was used to produce the marking-off template for scribing the rotor helices.

## Reconditioning Ball Mill Journals by Honing

In the accompanying illustration is shown an application of a Master-Hone to re-grinding the 33-in. diameter journals of a 10-ton ball mill at a North of England chemical works. This work was recently carried out by Nicol & Andrew, Ltd., 20 Kelvin Avenue, Hillington, Glasgow, S.W.2, makers of the honing equipment.

It was only necessary to remove the bearing caps and jack up the ball mill to allow the hone to be placed in position. The Master-Hone consists of a split pulley and frame carrying sets of grinding stones, the drive being provided by belt from an electrically-powered unit. Adjustment is provided for closing the stones, and the head is reciprocated over the work by a reactor attachment, which also equalizes belt tension.

Working continuously, it required three days to true up each journal, and the repair was completed to an accuracy of 0·002 in., with an average stock removal of 0·075 in. Had it been necessary to transfer the journal to a machine shop for more orthodox reconditioning, it is stated, the mill would have been out of service for a considerably longer period.

Reference has already been made in MACHINERY to applications of the Master-Hone equipment to marine engine crankshafts, and extrusion press rams, and it has also been employed in the reconditioning of colliery winding gear.

**Application of a Nicol & Andrew Master-Hone for re-grinding the journals of a ball mill**

# A New Stellite Hard-facing Process

A NEW PROCESS for the deposition of Stellite powders, to produce surface layers with heat, abrasion and corrosion resistant properties, has been introduced by Deloro Stellite, Ltd., Highlands Road, Shirley, Solihull, Warwicks. Known as powder welding, the new process is carried out with the aid of a torch that has been developed in collaboration with the Schori Division of F. W. Berk & Co., Ltd. In the accompanying illustration, a deposit of Stellite is seen being applied, with this unit, to the scroll of a component at the works of International Combustion, Ltd. Standard Stellite powders are used for the new process, with argon as the conveying gas, so that a supply of compressed air is not required.

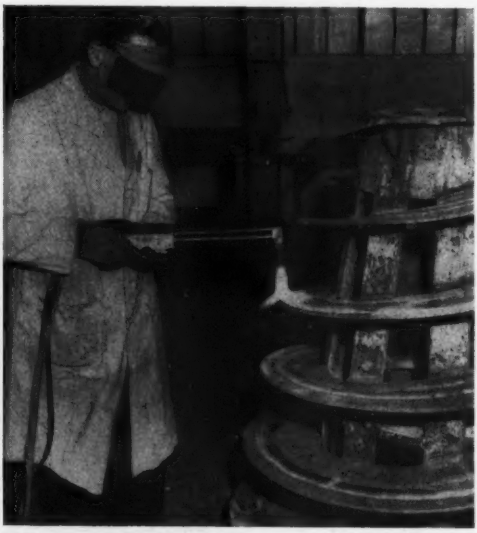
Powder welding, it is claimed, is particularly suitable for the deposition of relatively thin coatings, with thicknesses from $\frac{1}{32}$ to $\frac{1}{16}$ in.—the preferred maximum being $\frac{1}{8}$ in.—in bands up to 2 in. wide. Best results are obtained with thin base materials—optimum thickness ranges from $\frac{1}{4}$ to $\frac{3}{8}$ in.—although thicker material of weldable quality can be coated. The most rapid coverage is obtained on stainless steel. It is stated that coatings are deposited at four times the rates possible with gas welding, and twice as fast as with arc welding, and that powder losses are negligible. There is minimum distortion of the work, and spraying and fusing are carried out in one operation to produce a smooth deposit that needs little finishing. Moreover, little dilution of the deposited material by the base metal occurs.

The torch employed for the process is a standard Schori type 50 powder spraying pistol, fitted with a specially-designed extension. Oxygen and acetylene are fed directly from cylinders to produce the heating flame, independently of the powder feed. Argon conveying gas is delivered to a standard Schori powder hopper, of the type normally used for metal spraying, and serves to prevent oxidation of the powder or the deposited coating. The arrangements are such that the powder supply and the oxy-acetylene flame can be adjusted over wide ranges, completely independently, to suit the nature of the work that is to be hard-faced.

Before the protective layer is deposited by the powder welding technique, the surface of the work should be cleaned of all contaminants, such as oxide and grease. This cleaning can be carried out by turning, milling or grinding, for example, also by degreasing, or a combination of degreasing and one of the other procedures. It is not necessary to treat the surface by grit- or shot-blasting. The best method of surface preparation is to machine a shallow recess, not more than 2 in. wide, the wall of the recess forming a guide for the operator, whose aim should be to fill the space with the molten pool of the deposit. Powder feed is adjusted by the manipulation of the control valve at the base of the Schori hopper, and the intensity of the flame should be regulated in association with the rate of advance of the torch over the work, and the angle at which the work is set to receive the powder flow.

Fusing temperatures and other data relating to Deloro Stellite powders suitable for application by the powder welding technique are given in the table. It is stated that this method of hard-facing has less effect on the base metal than the well-known procedure of applying Stellite from a rod, with the aid of an oxy-acetylene flame, since the maximum temperature in the area of deposition is very much lower.

The area to be protected by hard-facing must be raised to a temperature of 600 to 700 deg. C.,



**Applying a deposit of Stellite to the scroll of a component at the works of International Combustion, Ltd., using the new powder welding technique developed by Deloro Stellite, Ltd.**

FUSING TEMPERATURES AND OTHER DATA RELATING TO STELLITE POWDERS SUITABLE FOR APPLICATION BY THE NEW POWDER WELDING TECHNIQUE OF HARD-FACING

| Type of powder | Approximate composition (per cent) | | | | | | | | Hardness of deposit (D.P.H.) | Approximate melting point (deg. C.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Co. | Ni. | Cr. | W. | C. | B. | Si. | Fe. | | |
| **COBALT BASE POWDERS** | | | | | | | | | | |
| Stellite SF.6 | 50 | 13 | 19 | 8 | 1 | 1·5 | 2·5 | — | 425 | 1,170 |
| Stellite SF.12 | 52 | 13 | 19 | 9 | 1 | 1·5 | 2·5 | — | 500 | 1,140 |
| Stellite SF.1 | 45 | 13 | 19 | 13 | 1 | 2·5 | 3 | — | 600 | 1,125 |
| **NICKEL BASE POWDERS** | | | | | | | | | | |
| Deloro SF.40 | — | 85 | 7·5 | — | — | 1·5 | 4 | 1·5 | 360 | 1,100 |
| Deloro SF.50 | — | 77 | 10 | — | — | 1·5 | 5 | 4 | 550 | 1,050 |
| Deloro SF.60 | — | 70 | 15 | — | — | 3 | 5 | 4·5 | 750 | 1,020 |

before deposition is started. Oxidation of the work surface due to the pre-heating is a limiting factor in applying the technique, and the most suitable base material is a stainless or oxidation-resistant steel. Moreover, material up to ½ in. thick is more suitable for treatment than metal of thick, irregular cross-section. It is claimed that the relatively high and uniform pre-heating serves as a safeguard against the setting up of local stresses during powder welding, and that, in consequence, distortion of components hard-faced by this method is reduced to a minimum.

Although it is customary to hard-face components in the normalized or annealed condition, service requirements may necessitate the protection of special steels which must be heat treated to obtain maximum strength. Hard-facing should never be attempted on the hardened material, and components should always be annealed prior to powder welding. Heat treatment can be carried out after hard-facing, depending on the grade of Stellite selected, and the work should be quenched in oil. The hard-facing deposit is unaffected by such treatment. For most applications, the only treatment that is necessary after powder welding is slow cooling of the work in lime or kieselguhr, or stress relieving, the time and temperature cycle for which depends upon the specification of the base material and its thickness.

Deposits applied by powder welding may be left in the "as welded" condition, or they may be finished by turning with conventional carbide tools or by grinding.

# Production of Precision Rollers

Murray's Pretoria Engineering Co., Ltd., 26-28 Pretoria Road, Romford, Essex, are now marketing a wide range of precision rollers and pins, under the trade name Murenco, for most types of roller box tools in general use, including those for Herbert, Ward, Brown & Sharpe, Index, and Taylor machines.

A production line has been laid down for machining batches of the rollers and pins which are in general demand, and it may be noted that sufficient quantities are normally held in store to meet customers' requirements. As a rule, supplies can be obtained by return post, or, in emergencies, by collection from the works. Roller blanks up to 1 in. diameter are produced from selected steel bar stock on Hahn & Kolb capstan lathes, and blanks of larger diameters, on Ward 3A capstan lathes. The circular blanks are heat treated to increase surface hardness to 63-65 Rockwell C, and are then honed in the bores to a high finish

**Fig. 1. The roller bores are finished by honing on this Raybrook horizontal machine**

on the Raybrook horizontal machine seen in Fig. 1, to a diametral tolerance of 0·0003 in.

External surfaces of the rollers are ground on a Myford ML 12 machine, with the work supported on close fitting mandrels which are held between centres, and it is thus ensured the bore and outer surface of each roller are accurately concentric. A slight external taper is produced during the grinding operation, and its direction is indicated by a letter "M" stamped on the side of each roller, which serves as a guide for correct assembly in the roller box.

Special work-holding fixtures with circular bases and expanding spigots, as seen in Fig. 2, are employed for locating the rollers from the bores for finishing on one face on a surface grinding machine. A socket screw in each fixture provides for expanding the spigot. The arrangement ensures that the ground face is accurately at right angles to the bore. When a batch of rollers of one size has thus been prepared they are mounted with the ground faces downwards on a magnetic chuck, and the opposite faces are then ground to give the required width dimension. The set-up for this finishing operation, on a Brown & Sharpe surface grinding machine, is seen in Fig. 3.

Mating pins for the various sizes of rollers are produced on a Ward 0E capstan lathe from 0·005-in. oversize drawn bright steel stock and are then mounted in a fixture and milled to produce a step at one end, and a locating flat. The pins, like the rollers, are hardened to 63-65 Rockwell C., and are then reduced to the required diameter by centreless grinding, to a tolerance of 0·0003 in.

**Fig. 2. Examples of the fixtures employed for grinding the faces of rollers accurately square with the bores**

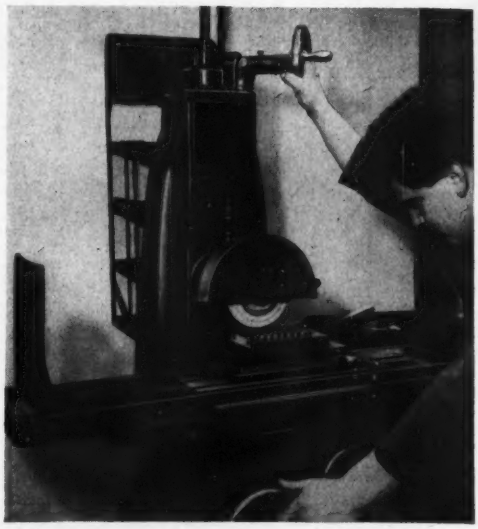


**Fig. 3. Opposite faces of batches of rollers are ground on this Brown & Sharpe machine**

After the completed rollers and pins have been inspected, they are selectively assembled and placed in store.

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LEVELTRON MULTI-POINT AUTOMATIC CONTROLLER FOR BIN LEVELS.—Thomas Industrial Automation, Ltd., Station Buildings, Altrincham, Cheshire, have developed an automatic controller to regulate the filling and emptying of bins, tanks and silos. This equipment can be supplied for controlling the operation of any required number of bins.

Each bin is fitted with Leveltron high and low level control units and solenoid or motorized valves for filling and emptying. A cyclic selection device in the console unit samples the signal from the high-level controllers in any desired sequence. If the level of the material in the bin being sampled is below the high level electrode, the filling valve is opened and then closed when the required level is reached. If a bin is already full, the sampling device will pass it and continue to the next bin in the sequence. A similar sequence takes place at low level, in conjunction with the emptying valves on the bins.

The consoles are designed to be weatherproof and dustproof, and a unit for 6-point control measures 2 ft. wide, 1 ft. 3 in. deep, and 5 ft. high.

# Numerically-controlled Machining Operations in the Giddings & Lewis Works

The Giddings & Lewis Machine Tool Co., Fond du Lac, Wisconsin, U.S.A., have played a very prominent part in the development of machines and control systems which enable a variety of operations to be performed automatically in accordance with information provided by punched or magnetic tape. At the Machine Tool Exposition held in Chicago last year the company adopted as their slogan "we practice what we preach," and as evidence of their confidence in the equipment that they supply and the production economies that it permits, it may be noted that by the end of the year a total of 14 numerically-controlled machines was in operation at the Fond du Lac works and those of associated companies.

A view of one of these machines, which has acquired a historic interest, is shown in Fig. 1. This skin and spar miller, with Numericord control (now supplanted by the Numeripath System) was described in MACHINERY, 87/151—15/7/55, and it may be recalled that it was available for demonstration in the Giddings & Lewis shops during the period of the previous Chicago Exposition in 1955. This machine, it is stated, has been in almost continuous operation since that time, and work which has been undertaken has included the production, within a comparatively short period, of 1,800 templates which were urgently required mainly for use in connection with tracer-controlled skin milling machines. So impressive was the performance of the machine in this connection, indeed, from the standpoints of speed, accuracy and low cost, that it is largely influencing the subsequent placing of very important orders for machines for the U.S. aircraft industry.

The table of this machine has a work area of 6 by 14 ft., and it is shown equipped with a rise-and-fall type cutter head at the right, and a 360-deg. head at the left, both of which can be operated under tape control. Anti-friction ways are provided for the table, cross-rail, and heads, and motions are transmitted through ball-screws, precision racks and pinions being employed for feedback.

On the occasion of a recent visit to the works, a modified Hypro plano-milling machine, equipped with the latest Numeripath control system, was being employed for 3-dimensional contour profiling on alloy steel pressure vessel covers, as seen in the close-up view in Fig. 2. These covers are machined on a contract basis and as will be observed in the illustration, each has a number of bosses for ports which project from, and must be blended with, the general hemispherical form. The areas between and around these bosses, both externally and internally, are machined under tape-control. Operation of the machine, it may be

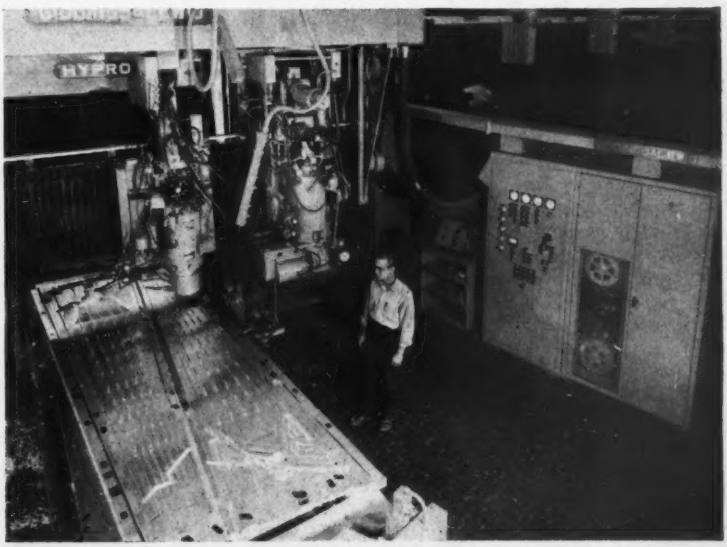


**Fig. 1. This numerically-controlled skin-milling machine has been in almost continuous operation in the Giddings & Lewis works for more than five years**

**Fig. 2. A close-up view of a contour milling operation on the internal surface of a pressure vessel cover. This work is performed on a modified Hypro plano-miller with Numeripath control**

noted, is considerably facilitated by the provision of read-out displays on the control panel, for the $x$, $y$ and $z$ axes. These displays show the positions of the moving members in relation to the datum points at all times.

Internal and external areas of the pressure vessel covers, outside the bands in which the ports are located, are conveniently machined by contour turning and boring, and the templates required to determine the tool paths for these operations are produced under numerical control.

A more representative application of numerically-controlled equipment is shown in Fig. 3. Here a headstock for a 4-in. table-type horizontal borer is seen set up on the indexing table of a floor-type drilling and boring machine arranged for Numeripoint control. The work is indexed manually to enable operations to be performed on different faces, but positioning and changes of spindle speed are obtained automatically from information on the control tape. As an alternative to the use of tape, co-ordinate settings can be selected by dialling on a control panel, but this method is very seldom used for production, although the facility may be useful when setting up. Provision is made for zero shift so that the programme datum point may be readily set in relation to the work.

Formerly, three headstocks of the type seen in Fig. 3 were machined in 43·9 hours, and with the tape-controlled installation this time has been reduced to 24·8 hours. Previously, moreover, the cost of the fixture and special tooling for such a component was considerable. With the method now adopted, no fixture is required and standard stub boring tools are used.

Another typical numerically-controlled operation in the Giddings & Lewis works is shown in pro-

**Fig. 3. Set-up for boring operations on the headstock for a table-type horizontal borer. The G & L floor-type drilling and boring machine is equipped for Numeripoint control**

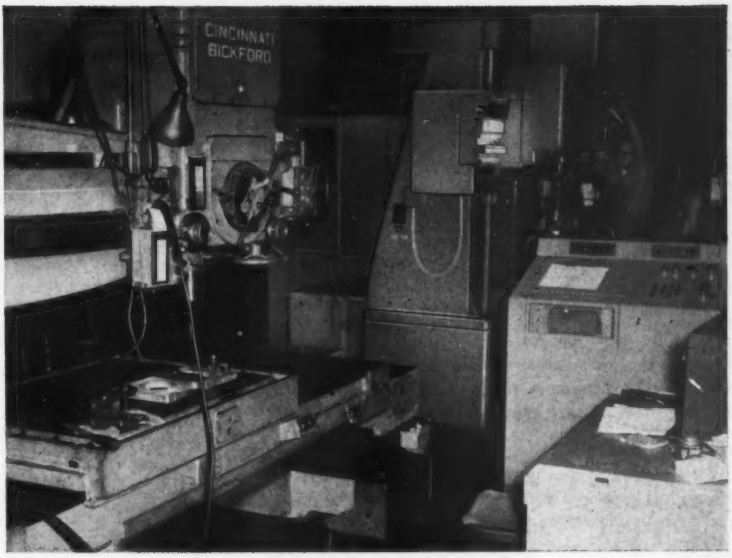


**Fig. 4. A bearing plate retainer is here being drilled on a G & L-Bickford radial machine equipped with a numerically-controlled positioning table**

gress in Fig. 4. Here, a bearing plate retainer is being drilled on a G & L-Bickford radial machine, equipped with a positioning table with Numeripoint control. The table is carried on anti-friction ways and is traversed by ball screws. Movement is at the rate of 360 in. per min. and settings are obtained without over-run to an accuracy of ±0·001 in. Here again, the control equipment provides for read-out displays of co-ordinates. Apart from positioning, the equipment provides for automatic feed and speed changes, also for the illumination of a signal light to indicate to the operator that tool changes are required.

During a recent test, it was found that six pieces were produced with the equipment shown in approximately half the time required to mark out the same number and drill them on a conventional machine.

In the background in Fig. 4 may be seen a Société Genevoise jig boring machine which is provided with the automatic repeating system for co-ordinate settings, as described in MACHINERY, 91/391—16/8/57.

Attention was recently drawn (MACHINERY, 97/1403—21/12/60) to the advantages that are being gained from the use of a Giddings & Lewis numerically-controlled boring mill with Numeripath equipment, for machining oil-well equipment at the works of the Gray Tool Co., Houston, Texas. An installation in the Giddings & Lewis plant, which consists of a 42-in. type VTL vertical boring mill with a Numeripoint control system, is seen in Fig. 5. This control system

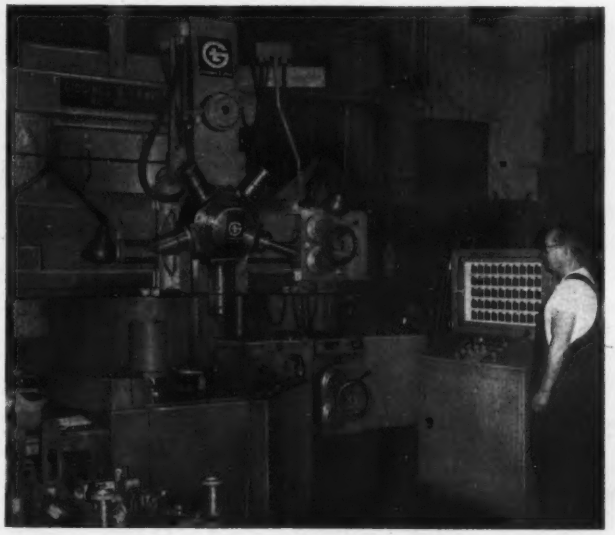

**Fig. 5. The control system for this G & L 42-in. type VTL vertical boring mill has provision for over-riding adjustment of individual tool positions in two axes. Davis pre-set tooling is employed**

**Fig. 6. A demonstration component which affords a good indication of the possibilities of numerical control for producing " difficult " forms**

provides for positioning, also for speed and feed changing, and an interesting feature is a position over-riding arrangement.

Davis pre-set tooling is employed on the machine, all setting being carried out in the tool store. When a batch of parts is to be machined, the pre-set tools are mounted in the turrets, and after the first cycle has been completed the various dimensions are checked. Adjustments for the positions of individual tools within a range of ±0·01 in. can then be made with the aid of potentiometers which are incorporated in the control equipment. There is provision for 50 individual corrections for tool position on each of the two axes.

The size of batch for which tape-control is economical necessarily depends on the form of the component, but it is frequently found that the " break-even " number is as low as three.

Two settings are required to complete the part seen in position on the machine in Fig. 5, and during a recent test it was found that the total time required for a batch of five was 3·4 hours. When these parts were produced under manual control, the time needed to machine five was 6·3 hours.

A second vertical boring mill of the same type is to be installed adjacent to that seen in the figure, and the two machines will be tended by one operator. These boring mills are available in 32-, 42-, and 52-in. sizes, and the tape-control systems can be readily disconnected at any time, if it is required to operate the machines manually.

As an example of the type of work for which numerical control offers particular advantages, attention is drawn to the demonstration piece shown in Fig. 6. This unsymmetrical oval form could normally be produced only by copying from a master. The programming necessary for the preparation of the control tapes for producing such a shape can, however, be carried out rapidly, and the machining is then completed entirely automatically.

That numerical control is now gaining wide acceptance in the U.S.A. will be evident from the fact that at the time of our visit to the Giddings & Lewis works, machines to be supplied with Numeripoint or Numeripath systems accounted for approximately 50 per cent, by value, of all orders in hand.

## Explosive Forming Die for a Missile Head

The illustration shows a die which has been made by the Propellex Chemical Division, Chromalloy Corporation, U.S.A., for the final forming operation, by the explosive method, on the 54-in. diameter head for a Polaris missile. Made from AMS 6434 high-nickel low-chromium alloy steel, the head is initially hot formed. Without being stress relieved or annealed, it is then loaded into the open die, which is filled with water. Carefully controlled explosive charges are then placed in predetermined positions, and when they are detonated, the component is brought to the required form within close tolerances.

**Open-type explosive forming die for a missile head of alloy steel**

# The Use of Speed Factors in Calculating the Load Carrying Capacity of Helical Gears

## A Discussion of the Necessity for Accuracy-graded Speed Factor Curves in Gear Design Formulæ

By A. FISHER, F.I.M., A.M.I.Mech.E.

IN CALCULATING THE LOAD CAPACITY of toothed gearing, it has, for almost a century, been customary to make use of some kind of speed factor to take account of the apparent stress-increasing effect of high speeds. The exact forms of the many speed factors suggested and used have, during the latter half of this period, varied a good deal as between one authority and another, but until quite recently all recommendations relating to industrial gear practice, as distinct from marine propulsion gear practice, agreed in one important respect, namely, that high speeds required the use of higher factors of safety than low speeds, relative to the static ultimate tensile strength of the material.

It seems fairly clear from a summary of the available information[1] that the concept of a speed factor was originally introduced entirely on the basis of strength considerations, experience then showing that high speed gears failed by tooth breakage at loads which low speed gears would carry quite safely. Such experience, combined with the known effect of live loads compared with that of dead loads, and the effect of kinetic energy variations with speed differences under the impact conditions associated with pitch or other errors, was no doubt responsible for the simple graded speed factors orginally suggested in 1868 by Walker. In noting the considerable fall in values for high speeds, it will be appreciated that machine cut gears were a rarity a century ago and large pitch errors must have been common.

During the whole of the period that speed factors have been employed in industrial gear design, the necessity for their inclusion in any formula used to calculate load capacity has always been considered to be adequately confirmed by innumerable results from the contemporary engineering practice. The suitability of the form of the speed factor curve—that is, the ratio of variation of factor of safety with variation in running speed—has also been continually re-assessed in a similar practical manner, by comparison of the gear size and strength calculations with records of tooth failures at different speeds as they became available.

By the beginning of this century, when machine cut gearing had largely replaced cast gearing, the relationship between speed and speed factor was universally accepted to be of the kind represented by the curve shown in Fig. 1. This particular curve (based on Walker's original factors) and the formula corresponding with it (devised by Carl Barth) have been very widely used and are probably still being used in some fields both in this country and in the U.S.A. The relevant formula is as follows:—

$$Y = 600/(600 + V) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where $Y$ = value of speed factor

$V$ = circumferential speed of gear (ft. per min.)

About 1910 it was noted in the U.S.A. that notwithstanding Lasche's alarming analysis[2] of pos-

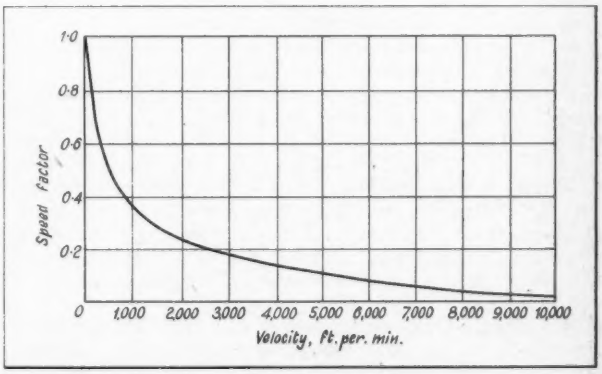


**Fig. 1. Curve of speed factors derived from Walker's 1868 values**

[1]All references given at end of article.

sible impact stresses in high speed gears containing appreciable pitch errors, actual experience seemed to indicate[3] that formula (1) above was too conservative with respect to gears running at speeds which were then considered to be high (about 2,000 ft. per min.). Tests were carried out at Stanford University, U.S.A., by Professor Marx in 1911 and 1912 and although they were at first taken only to 600 f.p.m., they seemed to confirm such views, as did later tests (1915) by Marx and Cutter[4], which were taken to speeds of 2,000 ft. per min.

As further experience was gained and—a very important point—as the accuracy with which gears were made was gradually increased, the conservatism of tooth loadings given by formula (1) for high speed gears became more apparent. It was then successively recommended by various authorities in the U.S.A., writing between 1912 and 1924, that the constant in formula (1) above, should be changed from 600 to 1,200, to 2,400, and to 3,000. The corresponding curves are shown in Fig. 2. The effects of these successive changes would be to decrease the factors of safety (from static values) previously used for high speeds, proportionately more than the factors employed for low speeds.

In 1924, however, Franklin and Smith[5], again at Stanford, confirmed formula (1) figures for gears with pitch errors of about 0·006 in., but also showed that at speeds of over 1,000 ft. per min. gears with pitch errors of about 0·001 in. would carry roughly twice the load carried by gears with errors of 0·006 in., while gears with errors of 0·002 in. gave results about halfway between the two. These three levels corresponded approximately with constants of 600, 1,200 and 3,000 in formula (1), and the appropriate speed factor curves are as shown in Fig. 2.

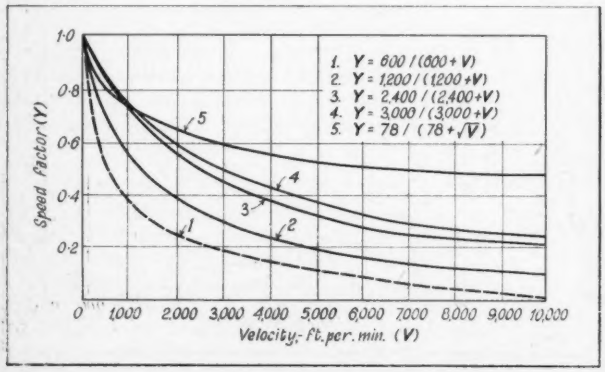


**Fig. 2. Speed factors recommended in U.S.A. between 1912 and 1927**

In 1927, A. A. Ross[6], of the General Electric Co., U.S.A., recommended that the formula be changed to

$$Y = 78/(78 + \sqrt{V}) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

The reason for the recommendation given by Ross was that he had found that even with a constant of 3,000 substituted in formula (1) above, the resultant speed factors were much lower (factors of safety higher) than could be used with safety at velocities over 4,000 ft. per min.

It was still firmly held that the speed factor curve should show a rapid drop from zero speed to about 1,000 ft. per min., and in experiments conducted by Heymans and Kimball[7] in 1923, using gears made of celluloid, it had been shown by photo-elastic methods that stresses increased nearly 100 per cent as the speed was raised from zero to 1,250 r.p.m.

Thus, during the 20 years from 1910 to 1930, when the B.S.I. Gearing Committee began work in this country, there was constant interest in the subject in the U.S.A., and a constant urge to raise the allowable loads on high speed gears to correspond with those shown to be safe by contemporary industrial practice and the various laboratory tests.

The A.S.M.E. Special Research Committee on gears had also been active, and in 1931 issued[8] a publication "Dynamic Loads on Gear Teeth," which stated that ". . . . it has been found by experience that after the gears reach a pitch line velocity of over 5,000 ft. per min. their load carrying ability is practically constant for any higher speed." This publication also referred to both U.S. and British practice in which formulæ for high speed gear loadings were used without making any allowance for differences in speed. The formulæ quoted appeared to be those used for marine propulsion (turbine) gears, which were at that time all regarded as high speed gears.

## EXPERIENCE IN BRITAIN

In Britain, the increased loadings which were being allowed on gears of increased accuracy had already, by 1920, caused the previously rather rare phenomenon of tooth surface pitting to become more common, particularly in marine propulsion gears, and the ratio of failures by pitting to those by simple tooth breakage (*i.e.*, without pitting) was tend-

ing to become reversed, even in industrial gears. In consequence, several investigators gave their attention to the difficult problem of devising a suitable criterion of design for pitting resistance. It was found, in practice, that if the gear face widths were made large enough for the tooth surface to be resistant to pitting, tooth breakage rarely occurred under legitimate loading conditions. Increased width permitted the use of smaller pitches, which reduced the effects of impact, and resulted in a still smaller proportion of failure by tooth breakage.

From a consideration of the onset and growth of pitting in actual examples, it was judged that pitting was a kind of fatigue failure produced by the peculiar local stressing conditions existing near the pitch line. Suggestions were therefore made that a factor associated with the number of repetitions of stress should somewhere enter into the calculations and might perhaps be permanently included in the criterion or formula for load capacity.

Exactly how this should be done, if the proposal were to be accepted, was a question that brought varied answers in accordance with the different schools of thought, and individual firms adopted their own individual methods, which were mainly empirical. One view which left its traces on British standards for many years was that a " life " or " running time " factor, or a speed factor, based on revolutions per minute rather than feet per minute, might meet the case if the values given by the curve fell by a constant decrement for constant percentage increases in speed.

Ideas on the main question, however—the fundamental necessity for a speed factor—which had seemed comparatively clear when strength was the only consideration, now became rather confused because of the rapidly decreasing numbers of failures by tooth breakage. It was nevertheless generally agreed that if the concept of a " standard life " could be accepted (*e.g.*, 50 hours per week on full load for a period of, say, 10 years) then it might be possible to adopt a speed factor based on r.p.m., of the same general form as had traditionally been used. The tooth loads would then be more or less appropriately reduced for the higher speeds and greater number of stress repetitions. In addition, the shape of the curve would roughly correspond with that of fatigue curves.

Similar views hovered around the question of " wear " (in the sense of slow erosion) and its effects

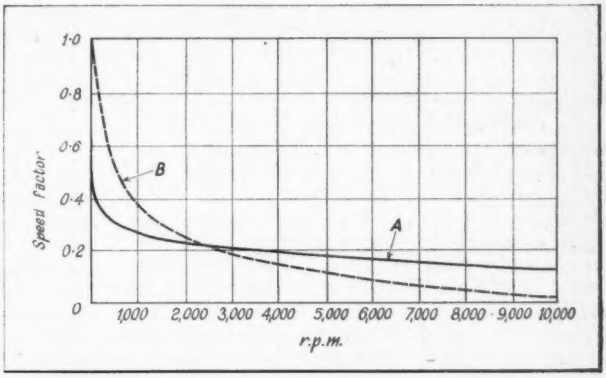


**Fig. 3. Speed factor curve of B.S.436 (*A*) compared with that obtained from the formula 600/(600 + V) (*B*)**

on length of life, and again the traditional form of speed factor, but with a gentler slope, seemed to be acceptable. Thus the speed factor, originally introduced for the purpose of providing a control on tooth breakages caused by impact stresses, gradually came to be looked upon as a combined and useful expedient on the grounds of impact stresses, straight fatigue, pitting fatigue, and " wear," in addition.

## THE BRITISH STANDARDS FOR GEARING

In 1930, with the formation of the B.S.I. Committee on gears, the desirability of presenting in the forthcoming British Standard an agreed formula for load capacity led to some " averaging " of views then held on the subject of speed factors. It is important to note, however, that a unanimous opinion prevailed that experience in the industrial gear field showed the absolute necessity of adopting a speed factor which would give numerical values for high speeds appreciably less than those for low speeds, but—coincident with U.S.A. views between 1910 and 1930—not so low as those given by formula (1) above.

The actual form of speed factor eventually agreed and published[5] in B.S. 436/1932 was essentially as shown by the full line *A* in Fig. 3. In line with the suggestion mentioned earlier, the curve follows very closely to the values obtained by the application of a constant decrement of 0·04 for each increase of 100 per cent in speed. The dotted curve *B* in Fig. 3 shows, for comparison, the Walker-Barth factor " 600/(600 + *V*)", and it will be noted that not only were the high speed values of the B.S. speed factor higher, but the low speed values were lower than those given by the

latter formula. In the light of present knowledge, these altered values can now be seen to have been well chosen in the circumstances then existing and with the standards of accuracy then to be relied on.

B.S. 436/1932 referred at some length in the foreword to the concepts of fatigue, impact, wear, and strength which had been held in mind when fixing the basis and form of the speed factor. Reasons were also given for the decisions then made—a useful procedure, which, in the writer's view, could well be extended in similar standards.

No serious objection to this speed factor, or indeed to the whole method of design for load capacity, was raised by industry so far as is known to the writer, and results from its use were for many years stated to be satisfactory, both by gear makers and by authorities who had been associated with the development and derivation of the formula and methods. Discussions sometimes took place, of course, amongst the technical staff of gear making firms after some failure at either high or low speed (these did occasionally occur), as to whether the cause had been metallurgical, mechanical, or theoretical (*i.e.* design), and if the latter, whether the speed factor or the surface stress factor was at fault.

Since comparatively little previous experience had been available when basic values for surface stress were fixed for some materials, adjustments of moderate magnitude were made in some cases. It is interesting to note that when this standard was revised in 1940[10], not only were some surface stress factors increased, but the low speed end of the speed factor curve (from 40 r.p.m. downwards) was also raised, as indicated in Fig. 4. This step showed that the committee then felt that the margin of safety for very low speed gears was excessive. There must, of course, have been some reason—if not grounds—for this view, at that time.

Besides increasing the values for very low speeds, however, the various increases in loads permitted for short running times were themselves substantially increased. It is to be presumed that it was considered that there were also good reasons for these changes, but the result was that gears running under slow speed, short time conditions, when designed to the new standard, were very heavily loaded, in comparison. For example, a steel gear running at 10 r.p.m. for ¼ hour per day would be loaded about 60 per cent more heavily than when designed to B.S. 436/1932. The bevel gear standard[11], B.S. 545/1949, confirmed the speed factors of B.S. 436/1940 but reduced the permitted increases for short running times.

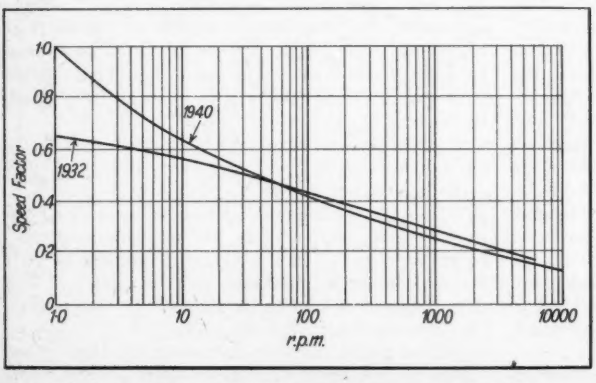


**Fig. 4. Curves for B.S.436 speed factors, 1932 and 1940**

## MARINE GEAR PRACTICE

During these various developments the marine gear industry had not seemed to be particularly concerned about the B.S.I. formulæ for gear load capacity. Indeed, the industry had always used its own methods of design, which, as mentioned above, did not include any speed factor of the kind recommended by B.S. 436. There had, of course, been many cases of severe pitting and some of tooth breakage in the main gearing of ships, but the causes were not thought to be connected with the question of use or non-use of a speed factor. By 1940, the failures were known to be mainly the result of inaccuracies in the gearing, caused by insufficiently accurate hobbing machines and cutting methods.

So far as the data that was available could be interpreted, it seemed to indicate that in marine double reduction sets, the high speed primary gears had a greater actual factor of safety than the lower speed second reduction gears. If, therefore, any speed factor were to be used, it appeared at this stage that it should be such as to produce rather higher loadings on the high speed primary gears, although the question of comparative accuracy would need to be taken into account. This view prevails in the marine gear industry today, although it should be noted that scuffing as well as pitting is held to constitute gear failure.

## LATER GEAR TESTS

During the last few years, experiments to determine the effect of speed on the load carrying capacity of accurately made and truly comparable

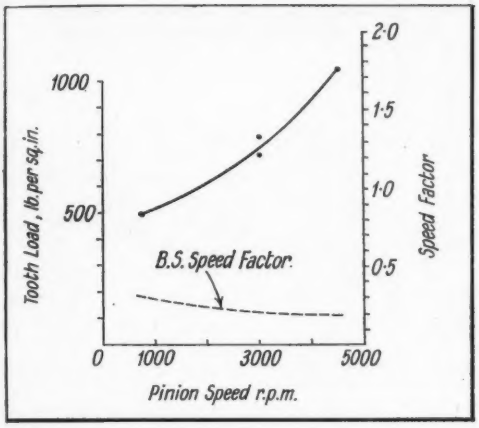


**Fig. 5. Curve showing effect of speed on load carrying capacity of shaved gears (En. 8 wheels). Each test covered 40 million load cycles**

gears have been carried out at N.E.L. These experiments were described in the 1959 Viscount Nuffield paper[12] presented before the Institution of Production Engineers by Dr. C. Timms. Sixty-eight pairs of shaved gears were tested at speeds of 750, 3,000 and 4,500 r.p.m. for 40 × $10^6$ load cycles. The results showed an increase of over 100 per cent in the load carried at the highest speed compared with that at the lowest. Fig. 5 shows the speed factor curve corresponding with these results, together with the B.S. 436/1940 curve. It should be noted that the gears were of quite small size, of controlled accuracy, and tested under laboratory conditions.

The results of these tests justify the consideration of more definite recommendations regarding the desirability of using different speed factors for different standards of accuracy, a practice first recommended about 40 years ago.

## THE LESSONS OF EXPERIENCE

In reviewing at this date the changing—and in the early years of this century, bewildering—practice in gear loading, the reason for the apparent discrepancies, or, rather, for the necessary changes, in speed factor values now becomes obvious. It is the increasing accuracy of manufacture that is responsible. As errors in profile and pitch of teeth have been gradually reduced, so have impact stresses and inertia effects. The increasingly rapid parabolic descent to zero speed factor at 2,600 ft. per min. indicated by Lasche and referred to by Wilfred Lewis[13] in 1922 (see Fig. 6), is eliminated when pitch and profile errors are removed. Instead, the speed factor curve at some intermediate speed begins to turn upwards.

It must not be thought that the speed factor can be assumed to increase continuously from zero speed, nor, conversely, that it should descend to zero at zero r.p.m. The N.E.L. experiments do not extend below 750 r.p.m., so far as has been reported, and further experiments will be required to cover the range between 750 r.p.m. and zero. In view of the undoubted greater stressing effect of a live load, compared with that of a steady load, it can be concluded that there is certainly a necessity for some fall from the static value as the speed rises. This point has been proved by the Heymans and Kimball experiments. The effect will presumably reach its maximum value when the equivalent velocity of load application reaches the natural velocity of deflection on the particular gear concerned.

It is clear, therefore, that different speed factor curves are required for different ranges of accuracy, and that further experiments are necessary in order that the specific values for each range may be determined.

## DEVISING NEW SPEED FACTOR CURVES

In devising new speed factor curves to be applicable for general practice, where gears of different grades of accuracy are used at any one speed, it is obviously essential to use actual results (loadings) from gears of equivalent accuracy, for each separate curve. This principle of fixing the speed factor value according to the accuracy is necessarily only imperfectly applied in the present B.S. 436 single

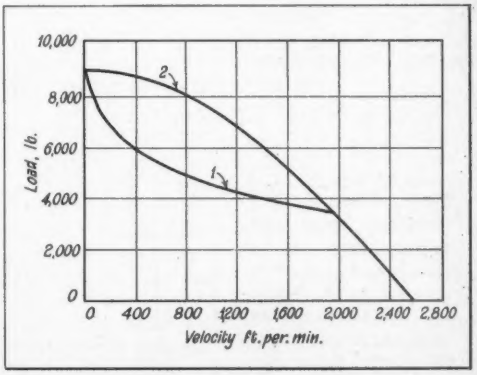


**Fig. 6. Comparison of allowable loads (1) Marx (actual). (2) Lasche (calculated)**

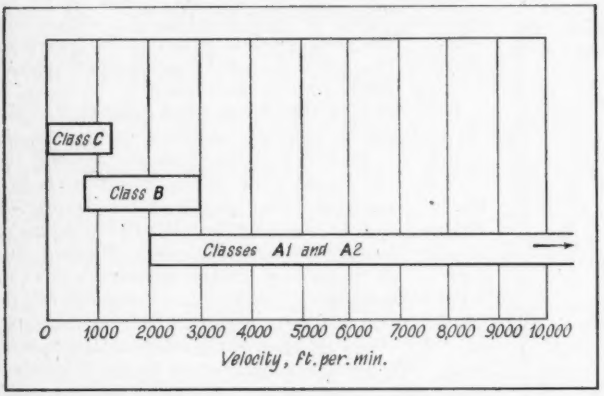


**Fig. 7. Chart showing overlap of speeds for different accuracy grades**

curve, because the recommended ranges of speed for gears of the four relevant grades of accuracy are very wide and overlap, as shown in Fig. 7.

It is true that the present relationship is in the right direction—higher speeds, higher accuracy—and it is for this reason that the B.S. 436 speed factor curve does not: (*a*) descend rapidly at high speeds as it would if derived to suit a constant low standard of accuracy throughout; or (*b*) curve upwards at high speeds as it would if derived to suit a constant high standard of accuracy.

The B.S. 436 speed factor curve corresponds as well as can be expected with existing average practice, but the latitude of variation in accuracy of gears naturally causes a considerable spread when actual results are plotted against the curve, as will be seen below. This spread will not be removed until accuracy is tied more closely to speed and different speed factor curves are used for the different grades of accuracy.

In *The Engineer* for November 13, 1959, Mr. A. Sykes put forward[14] a new proposal for helical gear design, based primarily on the use of a speed factor curve intended to represent the trend of recent years, in the respect that the values suggested for high speeds are appreciably higher than those for low speeds. In other words, the direction of inclination with speed is opposite to that of the B.S. 436 curve. Otherwise his proposal is, in general principle, essentially similar to that of B.S. 436, with the exception that an additional "fatigue" factor has been introduced, which partly neutralizes the effect that the suggested speed factor would otherwise have.

A large number of examples of failed and successful gears, 46 pairs in all, is given in the form of tables—an invaluable collection of data—and the suitability of the new proposed speed factor curve can be examined by checking loadings derived from its use, against actual loadings used on the gears to which the tables relate. If this check is carried out without using the suggested fatigue factor, it will be found that an additional correction or neutralizing factor is required in order to produce the actual loadings quoted in the tables.

Now it will be recalled that when pitting rather than tooth breakage became the ruling type of failure and a new speed factor curve was devised, to allow for the fatigue effect in addition to some

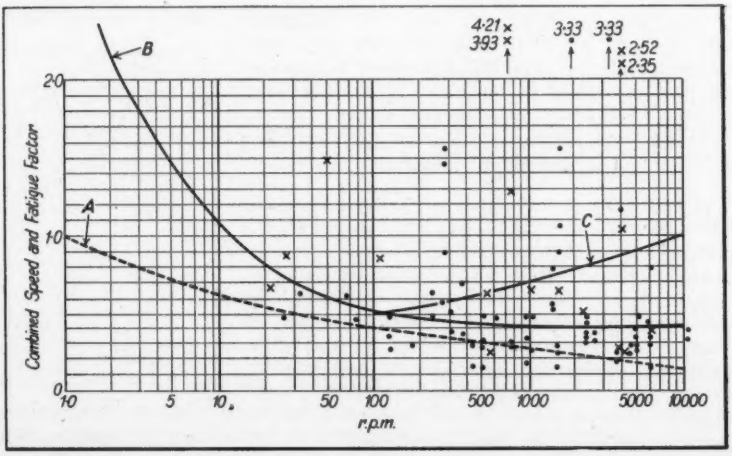


**Fig. 8. Values of "X" (combined speed and fatigue factor) for 46 examples of gear drives recorded by A. Sykes. (*A*) B.S.436 - combined speed and fatigue factor. (*B*) Fatigue factor suggested by A. Sykes. (*C*) Speed factor suggested by A. Sykes**

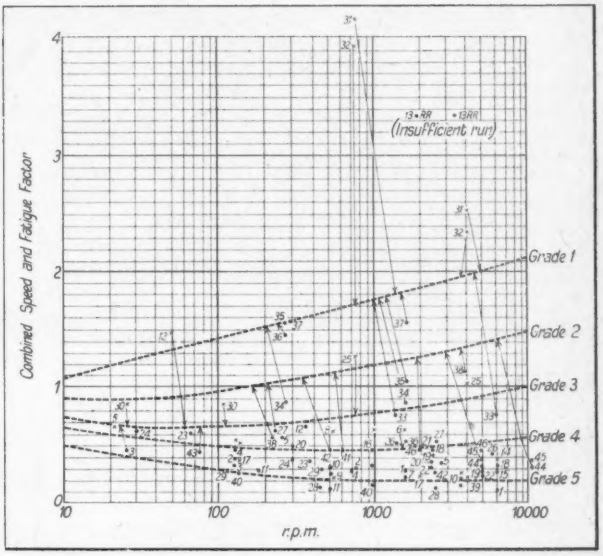


**Fig. 9. Tentative suggestion for location of graded speed factor curves**

impact effect, this curve, like that of formula (1), was given a downward trend at high speeds because a high number of repetitions of stress—at which fatigue effects become apparent—is, in general, associated with high speed. If the fatigue effect has been catered for in the form of a separate curve, the speed factor curve would have required somewhat higher values at high speeds than it has, for example, in B.S. 436.

If, however, when using a separate fatigue curve, the revised speed factor curve were to be given an excessive rise at high speeds, either an additional correction factor would be needed to bring the high speed loadings down again and make results correspond with actual practice, or this correction factor could be combined with the fatigue factor, which would not then be a true fatigue factor, though it might well make a workable combination with the speed factor.

It is known that for polished steel laboratory specimens running without any impact effect, the bending fatigue value, for steel, is about one half the static ultimate tensile strength. What the fatigue value is for steel in the form of toothed gears running under impact conditions is not known, but there are good grounds for believing that the slope of this fatigue curve at high numbers of stress repetitions is more pronounced than that of the "standard" bending fatigue curve.

So long as the actual gear fatigue curve is not definitely known, it may be argued that any combination of suggested fatigue curve and speed factor curve that gives results corresponding with practice is acceptable. In this sense, the combination proposed by Mr. Sykes is acceptable, if—that is—a single speed factor curve for all grades of accuracy is compulsory. In the writer's opinion, however, it is a logical necessity to use different speed factor curves for different grades of accuracy. If this course were adopted it would immediately show that the new "fatigue" factor proposed by Mr. Sykes is quite incapable of satisfying the wide range of results obtained in actual practice.

It is therefore suggested that the logical method of procedure in this problem is not to begin by assuming a speed factor curve which may be appreciably in error, but first to calculate the combined speed and fatigue curve values (corresponding to B.S. 436 speed factors, which are also combined) from the actual loadings given in the tables provided, by the substitutional method used by Mr. Sykes, thus:—

The present B.S. 436 loading formula is of the type—

$$\frac{A \times B \times C \times D \times X}{E \times F \times G} = \text{Permissible loading.} \quad (3)$$

where $X$ = combined speed and fatigue factor
where $A$ to $G$ = other factors

Substituting in the above formula the actual values of loading on any particular gear, enables $X$ to be determined, thus:—

$$X = \frac{\text{actual loading} \times E \times F \times G}{A \times B \times C \times D} \quad (4)$$

When this course is followed for all the given examples, the results can be plotted on a base of r.p.m. (not repetitions of stress) as in Fig. 8, and this chart can then be used as a framework for the arrangement of different speed factor curves required for the different grades of accuracy covering the examples quoted. The different examples can then be related to their respective curves and the service results reviewed.

In Fig. 8, crosses represent failed gears and plain dots represent satisfactory or doubtful gears. The

fatigue and speed factor curves suggested by Mr. Sykes are also shown. A very tentative suggestion for location of the various speed factor curves is shown in Fig. 9, using the same examples, related to five grades of accuracy. These grades might perhaps bear some relation to gears classed as follows: —

(1) Ground, lapped or shaved gears with corrected helices and in classes $A_1$ and $A_2$, B.S. 1807 (gears for turbines and similar drives).

(2) Ground, lapped or shaved gears without helix correction and in classes $A_1$ and $A_2$, B.S. 1807.

(3) Gears hobbed on grade A hobbers (B.S. 1498) and in class B, B.S. 1807.

(4) Gears in class B, B.S. 1807, or classes $A_1$ or $A_2$, B.S. 436.

(5) Gears in class C, B.S. 436.

Again, these suggestions are very tentative.

If, after laying out these graded speed factor curves, it should be decided to attempt to separate the fatigue effect and construct separate fatigue curves, this could be done by the same procedure as outlined above, namely, by substituting the speed factor value in formula (3) and determining the correction required to reproduce the actual loading in each case. These separate fatigue factors (one for each speed factor curve) could then be plotted on a base of repetitions of stress, as necessary. Since the form of the gear fatigue curve is not known, however, it would not easily be possible to ascertain exactly how much of the apparent adjustment was due to the fatigue effect proper, and how much to any error in the inclination of the relevant speed factor.

In conclusion, the foregoing discussion leads to the suggestion that the B.S.I. Committee concerned with this problem should give attention to the present proposal to use different speed factor curves for gears of different standards of accuracy, so that when the next revision of B.S. 436 is issued, it will represent a substantial advance on present methods, which deal only partially and indirectly with the point discussed here.

## THE EFFECT OF SPEED ON METALLURGICAL PROPERTIES

During the last two decades, as it became increasingly clear that there was a possibility of gear load capacity increasing with higher speeds, many suggestions for possible causes have been put forward. It has been noted, for example, that the effect of increasing the speed of application of load increases both the yield point and the ultimate tensile strength of steel[15], [16], [17], notwithstanding any increase in stress due to live load effect. For high speeds the increase may be considerable.

It follows that a given steel with constant "static" mechanical properties must be considered to be a completely different material—stronger, not weaker—when stressed under high rates of loading. This conception may be new to many.

It is probable that deflection magnitudes will also change with change in speed of load application, increasing as the speed rises from zero, reaching a maximum at the natural velocity of deflection and then falling again. Both these effects will no doubt contribute something to the form of the speed factor curve.

REFERENCES

1 Spur gearing. D. Adamson. Paper read at I.Mech.E. May 19, 1916.

2 Gear error effects. O. Lasche. *Zeit. d. Ver. Deu. Ing.*, Vol. 43, 1899.

3 Discussion on Marx and Cutter paper. Kate Gleason. *A.S.M.E.*, Vol. 37, 1915.

4 Strength of gear teeth. Marx and Cutter. *A.S.M.E.*, Vol. 37 1915.

5 Effect of inaccuracies on strength of gears. Franklin and Smith. *A.S.M.E.*, Vol. 46, 1924.

6 High speed gears. A. A. Ross. Paper read at A.G.M.A., 1927.

7 Stresses in gear pinions. Heymans and Kimball. *A.S.M.E.*, Vol. 44, 1923.

8 Dynamic loads on gear teeth. *A.S.M.E.* Research Publication, 1931.

9 B.S.436/1932. Machine cut gears, helical and spur. B.S.I., 1932.

10 B.S.436/1940. Machine cut gears, helical and spur. B.S.I., 1940.

11 B.S.545/1949. Bevel gears. B.S.I., 1949.

12 Viscount Nuffield Paper. Recent developments in spur and helical gears. C. Timms, D.Eng. Inst. Prod. Eng., 1959.

13 Effect of speed on strength of gear teeth. Wilfred Lewis, *A.S.M.E.*, 1923.

14 Allowable load on helical gears. A. Sykes, O.B.E. *The Engineer*, Nov. 13, 1959.

15 Tensile yield strength of steels under suddenly applied loads. Warnock and Brennan. *Inst. Mech. E.*, Vol. 159, 1948.

16 Dynamic yield strength of steel at intermediate rates of loading. Brown and Edmonds. *Inst. Mech. E.*, Vol. 159, 1948.

17 Effect of stretching speed and loading rate on yielding of mild steel. E. A. Davis. *A.S.M.E.*, 1938.

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THE KIDDE COLARM WARNING UNITS for evacuation of factories and similar buildings in the event of fire or other hazard, are self-contained and cannot be put out of action on account of damage to electric wiring, for example. Charged with $CO_2$ these units, which are marketed by The Walter Kidde Co., Ltd., Belvue Road, Northolt, Greenford, Middlesex, are available in 5-lb. and 10-lb. sizes with operating periods of 1½ and 3 min., respectively. They are intended to be hung on walls close to exits, but can also be stood on floor. A unit, while being carried in one hand, can be readily switched on and off, and has a power output of 100-120 decibels in the 1-3 kilocycle range. It is stated that virtually no maintenance is required.

If the temperature exceeds 120 deg. F., the units will operate automatically, but they are not intended for use as detectors. Complete installations can be provided, if required, each comprising a number of sirens permanently connected by piping to a large cylinder.

# Making Metal Spectacle-frames

## Methods Employed by the British American Optical Co., Ltd., Watford

By S. C. PAULSEN, Associate Editor

In earlier articles in MACHINERY (81/380—28/8/52 and 81/1265—19/12/52) were described certain processes and equipment employed in the manufacture of metal spectacle-frames at the Watford, Herts., frame-factory of the British American Optical Co., Ltd. Here, some examples of press-operations and bending equipment are considered.

### CONTROLLED WORK-HARDENING

In order to combine lightness with strength, the copper-base nickel-alloy wire from which most of the frame-details are made, is subjected to a considerable amount of cold-working, to improve its mechanical properties. Among the processes employed are swaging, forging, coining and upsetting, the amount of deformation and the operational sequence adopted depending upon the degree of work-hardening required in the finished component. A high proportion of the frames produced is made from gold-coated or, as it is termed, "gold-filled" wire. When using such material, many orthodox operations such as blanking, piercing, shearing and, in fact, almost any type of cutting process, are precluded by the necessity for maintaining continuity of the gold layer. The ductility of the gold coating, however, is such that the wire can be elaborately cold-worked by plastic deformation methods, the surface layer meanwhile remaining intact.

A typical example of a modern frame, made by the company under licence, is the Numont brow-bar design shown in the heading-illustration. This frame, which combines lightness and comfort, is of a flexible rimless type, each lens being pivotally supported by a U-shaped clip, termed the "strap," attached to the bridge. A small screw passes through the strap and a hole in the lens, which is stabilized by a small 3-leaf spring assembled between the arms of the strap. This spring bears on the edge of the lens to prevent it from pivoting freely on the screw, and affords sufficient resiliency to minimize risk of damage should the lens receive an accidental edgewise blow. This portion of the assembly is seen in greater detail in Fig. 1, where the strap is shown at *A*, the pivot-screw at *B*, and the leaf-spring at *C*.

Each of the folding side-members of the frame, which are known as "temples," is attached to the bridge and lens-mounting assembly by means of a single compound curved member, termed the "brow-bar." The brow-bar is designed to offer a minimum of visual obstruction and follows, approximately, the outline of the upper edge of the lens, the attachment-point for the temple being well above the pupillary centre. With this

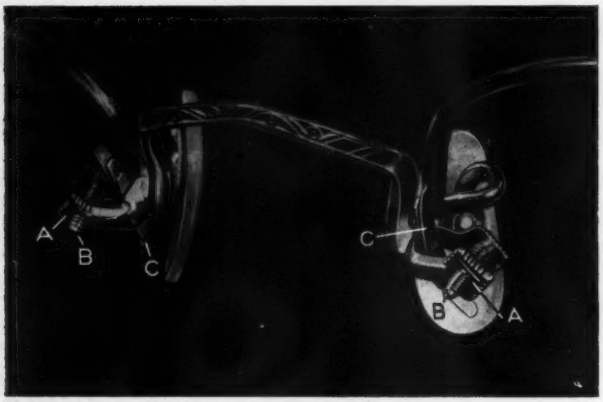



**Fig. 1. A close-up view of the lens-mounting assembly employed on spectacle-frames of the Numont design, made by the British American Optical Co., Ltd.**

system of lens-mounting, not only is the frame neat and unobstrusive, but each lens is, in effect, mounted independently so that frame-flexure cannot be communicated to it.

## OPERATIONS ON LENS MOUNTINGS

The U-shaped straps, to which reference has been made above, are first coined from 0·060 in. diameter gold-filled wire, to the form shown at *A* in Fig. 2. The upper surfaces of the straps, it will be noted, are slightly rounded, and have a decorative pattern, while the under-sides are flat. Coining to this form, including the production of the pattern, is carried out in simple single-cavity dies, set up in an Edwards 70-ton crank-press, with handfeed. The spacing of the impressions is controlled visually, by reference to a datum-point on the lower die, and with this equipment, 400 straps are coined in an hour.

As will be seen from Fig. 2, the work emerges from the dies as a continuous strip, in which the individual pieces are joined by a thin flash. It is necessary for the under-sides of the pieces to be accurately flat, and this condition could not readily be achieved without undue complication of the press-tools. The under-sides of the straps are therefore trued, and at the same time the pieces are separated by removal of the flash, at a skiving operation, the form of the component after this stage being shown at *E* in Fig. 2. In this instance, removal of the gold layer is permissible because, in the finished product, the skived surface is turned inwards, as seen at *F* in Fig. 2, and is concealed by the lens when it is assembled.

## SKIVING MACHINE

Skiving is carried out on the special-purpose machine shown in Fig. 3. A crank-operated slide *G* carries a V-nosed skiving-tool *H*, and the work is located, face-downwards, in a cavity in the fixed block *J*. A pivoted arm *K* carries a pair of cone-ended screws *L*, which serve to hold the work firmly in the locating-cavity during the initial part of the cutting-stroke. In operation, the arm *K* is slightly raised by means of the extension-arm *M*, and the first piece in the strip is located in the cavity. Light finger-pressure on the extension-arm *M* then serves to hold the work in place. A pedal is next depressed to operate a clutch

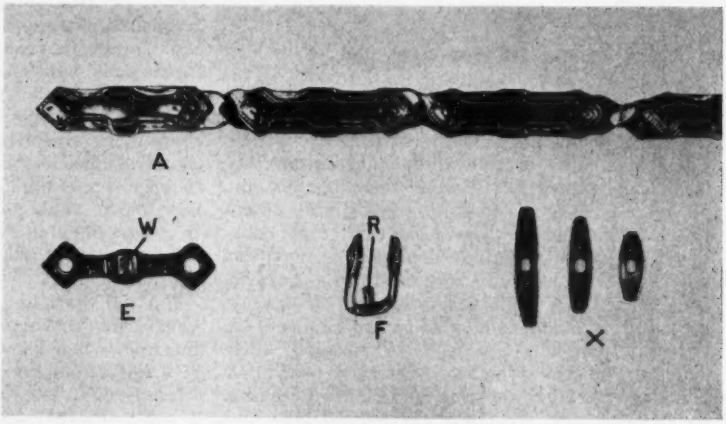



**Fig. 2. Stages in the production of the lens-mounting straps. Below is also seen a set of three spring-leaves, the largest of which is approximately ¼ in. long**

which connects the motor-drive to the crank, whereupon the tool-slide travels forward.

The height of the tool is such that the under-side only just clears the upper surface of the block *J*, and the edge, it will be noted, is backed-off to an acute angle. At a point during the forward travel at which the tool is about to cut, a dog *N* on the tool slide engages a cam *P* on the end of the arm *K*. The cam and dog have inclined faces which, at this stage, apply clamping-pressure, through the arm *K* and the screws *L*, to the work. As the tool continues to travel forward, this pressure increases up to the point at which the cam rides over the top of the dog, the pressure thereafter remaining constant for a short time. During this period, the point of the tool, advancing between the screws *L*, has begun to cut.

Just before the tool reaches the screws, the bottom face of the cam rides clear of the top of the dog, leaving the arm *K* free to pivot. By this time, the tool has advanced sufficiently far over the face to hold the work firmly in the locating-cavity. Thus, when the tool reaches the conical faces of the screws *L*, they, together with the arm *K*, are lifted clear by the wedging action of the backed-off faces. At the end of the return stroke, the cam and dog are clear of each other so that the arm *K*, can be raised for loading a fresh piece, the tool drive meanwhile having been interrupted automatically by a trip-mechanism that disengages the clutch. A shaving of metal approximately 0·003 in. thick and including the flash, is removed from the back of the work-piece, the thickness of which is meanwhile established by the depth of the locating cavity. With the equipment described, 450 pieces are skived in an hour.

Following skiving, the pivot-screw holes and

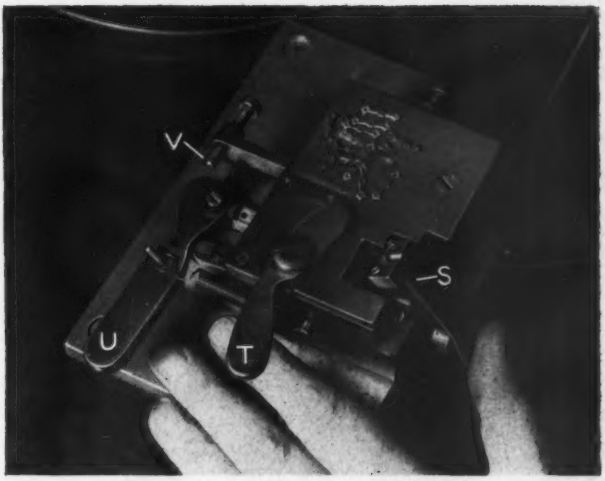



**Fig. 4. This small bench-mounted device cuts rectangular-section wire and inserts the cut lengths into the lens-straps to form rivets at a single stage. The output is 450 pieces an hour**

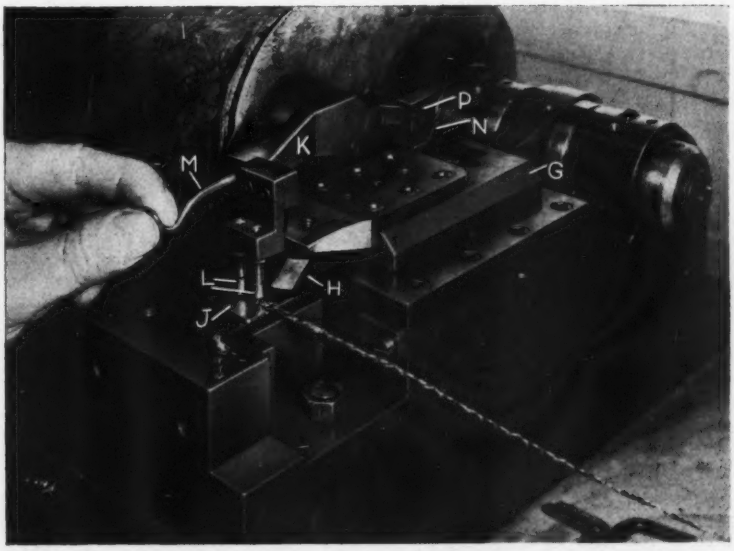



**Fig. 3. Machine for skiving the under-sides of the lens-straps after coining from wire. This operation, which removes approximately 0·003 in., separates the pieces by removing the flash**

**Fig. 5. Bench-mounted, hand-operated fixture for bending the lens-straps. This equipment is employed in preference to a press-tool, to ensure that the gold coating is not damaged**

the central hole for the rectangular-section leaf-spring retaining-rivets (*R*, Fig. 2) are punched simultaneously in an orthodox type of press-tool on a 2-ton crank-press. Next, rivets are cut from rectangular-section wire, and are pressed into the holes with the aid of the small bench-mounted hand-operated fixture shown in Fig. 4. A pivoted thumb-lever *S* has a rectangular head, on the forward face of which the workpiece is located by pegs that engage the pivot-screw holes. When loaded, the lever is released and the forward end drops into an opening in which it is locked by rotating the catch-lever *T*.

The rivet-wire, which is of 0·041 in. by 0·022 in. section, is fed into an aperture in the front of the fixture. This opening guides it into a corresponding hole in a plate which slides laterally in a slot within the body of the fixture. The depth to which the wire is fed in is limited by the end engaging the far wall of the slot. The length of wire projecting into the hole in the plate is thus equal to the thickness of the plate. This length is then sheared off by depressing a pedal, which causes the plate to move to the left. The travel of the plate is checked by a stop which is so arranged that, at the end of the stroke, the hole, still containing the sheared wire, is aligned with the corresponding hole in the work.

A cam-lever *U* is then pushed towards the rear until it meets a stop *V*. This action operates an ejector-punch which pushes the rivet out of the hole in the plate and into the workpiece. The stop *V* limits the travel of the punch, and the rivet is pushed fully home, with the rear end flush with the rear face of the work. Clearance for the projecting front end of the wire is afforded by a hole in the front face of the lever *S*. The ejector-punch is then withdrawn by releasing the lever *U*, and the thumb-lever *S* is unlocked and raised to the position shown in the illustration. Tweezers are used to lift the work off the locating pegs, and it is allowed to fall into the opening below, whence it passes to a chute. At this operation, the rivets are inserted in the straps at a rate of 450 an hour. The rivets are a push-fit in the holes, and they are subsequently secured in position by an operation known as "mitring." Each piece is placed, rivet-shank upwards, in a shallow cavity die, and a hollow rectangular section punch, with slightly inclined bottom faces, is used to form a shallow indentation surrounding the base of the rivet (*W*, Fig. 2). This operation, which is carried out on a 2-ton crank-press, peens the material inwards round the rivet so that it is tightly gripped. In this way, it is ensured that the rivet is not displaced during subsequent operations prior to soldering. After mitring, the straps are bent to the asymmetrical U-shape seen at *F* in Fig. 2.

### BENDING THE LENS-MOUNTING STRAPS

For this purpose, the small bench-mounted fixture shown in Fig. 5 is employed. Bending cannot be carried out with press-tools, because of the risk of damaging the gold coating of the outer surface. The tool is therefore designed to wrap the piece to the required shape. For loading, a flat-ended punch, drilled to clear the rivet, is raised by means of the hand-lever *Y*. Beneath the punch there is a pad with a shallow cavity in which the central portion of the work is then located. There are two mandrels mounted on a common axis, one on each side of the pad, and they are provided with dogs *Z* to engage the ends of the straps.

To the outer ends of the mandrels are secured cranks, one of which is seen at *A*. These cranks are connected by links *B* to a pair of blocks *C* which slide vertically in slots in the sides of the fixture. The blocks are actuated by a pedal-mechanism, and thus serve to rotate the mandrels. When the pedal is free, and the blocks *C* are in the upper position, one of the cranks *A* is slightly behind, and the other slightly in front of, top dead

centre. At this position, the working faces of the dogs are slightly below the under-side of the work. The hand-lever *Y* is lowered, so that the work is gripped against the locating-pad by the punch, and the pedal is then depressed.

By reason of the dead-centre arrangement of the cranks, the mandrels rotate simultaneously in opposite directions, and the dogs wrap the ends of the strap round the punch. The end of the punch and the face of the locating-pad are inclined at an angle corresponding to that which the central portion of the bent strap makes with the arms (see *F*, Fig. 2). This inclination is necessary to ensure that the lens is carried at the correct angle in relation to the bridge-piece in the assembled frame. With the equipment described, bending is carried out at a rate of 325 pieces an hour.

### PRESS-TOOL FOR THE SPRING-LEAVES

For making the small spring-leaves *X*, Fig. 2, which stabilize the lenses on the pivot-screws, the two-stage press-tool shown in Fig. 6 is employed. The tool is set up in an Edwards 25-ton crank-press, and the strip, which is of 0·008-in. stainless steel, is advanced by an intermittent-feed device. A crank-disc *D* is connected to the press-ram by a link *E*, and is thus caused to oscillate through a small angle with the rise and fall of the ram. Connected to the crank-disc is a shaft which rotates a pair of toothed rollers *F*, that mesh in the same manner as a pair of gears, with the scrap work-strip passing between the teeth. Thus, the scrap is crimped as it travels through the rollers, and a positive feed is ensured.

The drive to the rollers is taken through lost-motion and pawl-and-ratchet devices which are so arranged that rotation always takes place in the same direction, and only during the latter part of the return stroke of the ram. This delayed action ensures that the punches are raised clear before each feed-stroke begins. The first stage of the tool (*G*) is of the compound type, and the piece is blanked and pierced, and then pushed back into the strip. When the strip, carrying the flat piece with it, reaches the second stage, a semi-circular punch *H* descends and presses the strip and work into a correspondingly-shaped die, bending both to an arcuate form.

The tension in the work-strip, however, is so adjusted that the bend in the strip is pulled out nearly straight at the next feed-stroke, leaving the now-completed leaf still in the strip, but with the ends projecting above it. This result is ensured by the positive-feed feature previously mentioned. Adjacent to the second-stage station, a work lifter is mounted immediately above the work-strip. As the strip passes beneath it, the projecting end of the workpiece is raised by the tapered front edge of the lifter member, and the piece is thus brought clear of the hole in the strip. An air-jet then blows the workpiece into a chute whereby it is delivered at the front of the tool. Completely automatic in action, this tool produces 120 finished spring-leaves per minute.

### HAND-OPERATED BENDING FIXTURES

Several small hand-operated bending fixtures are employed for operations on spectacle frame components and examples are seen in Fig. 7 and 8. The fixture shown in Fig. 7 serves for bending

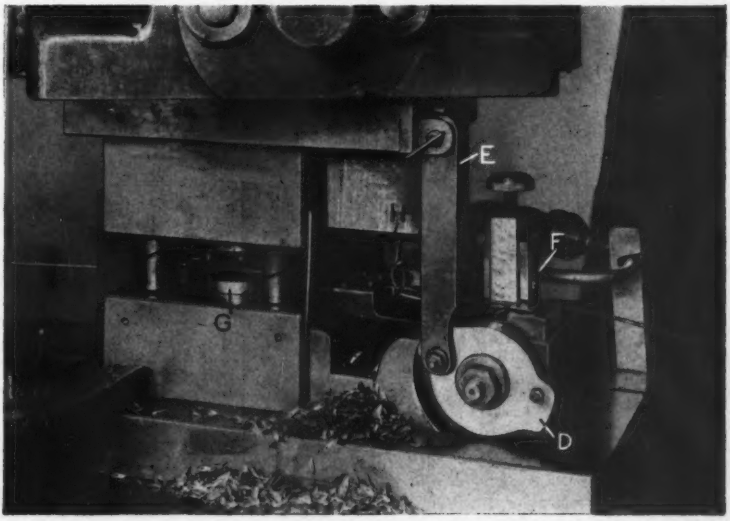



**Fig. 6. Two-stage press-tool set up in a 25-ton crank press, for producing the lens-mounting spring leaves from 0·008-in. stainless steel strip at the rate of 120 a minute**

**Fig. 7. Bending brow-bars for Numont frames. The former is highly polished and the bending roller is spring loaded**

the brow-bars of the Numont frame, and has a pedal-operated clamping device. Depression of the pedal closes profiled jaws which grip one end of the work, and a roller *J*, mounted on a hand-operated, pivoted arm, wraps the work round a highly-polished former. The curvature of the former is non-circular, and the roller is therefore mounted on a spring-loaded plunger. With this fixture, approximately 330 pieces are bent per hour.

In Fig. 8 is shown a fixture employed for forming the triple bends in the pad-arms. Various stages in the production of pad arms are shown in Fig. 9, and an arm on which the three bending operations have been carried out is seen at the bottom. Bend *K*, the first to be formed, is in the plane of the "spoon," at the junction of the spoon with the shank. The second bend to be formed, *L*, is in a plane approximately at right angles to the spoon, and *M* is a return bend in the same plane as *L*.

In the fixture shown in Fig. 8, which is seen at a stage where bend *K* has just been formed, the work is located by the "bowl" of the spoon. The spoon is placed, concave-side upwards, in a corresponding cavity, in which it is secured by a cam-operated clamping-finger *N*. The locating-cavity is near the edge of the block in which it is formed, and the shank of the work, after it has been clamped, projects horizontally beyond the block. The bend *K* is formed by means of a mandrel *P* which can slide vertically and is equipped with a handle as indicated at *R*.

The upper end of the mandrel terminates in a disc, from the upper faces of which projects a dog. The bend is made by raising the mandrel to a position such that the dog engages the shank of the work, which is then bent by turning the mandrel with the handle.

When the operating handle is turned, the dog wraps the shank round a radiused corner on the supporting block, this corner being formed at the intersection of the locating-depression and the face of the block. The angle of bend is limited by the handle *R* engaging the stop-screw *S*.

Bends *L* and *M*, Fig. 9, are formed in one movement by a second, similar mandrel, *T*, with its axis horizontal. When the bend *K*, Fig. 9, has been formed, the mandrel *P* is disengaged and lowered, and the second mandrel is advanced to engage the work. This mandrel has two pins on the

**Fig. 8. Mandrel-type bending fixture for forming the three bends in the pad-arms. Output from this fixture is 330 pieces an hour**

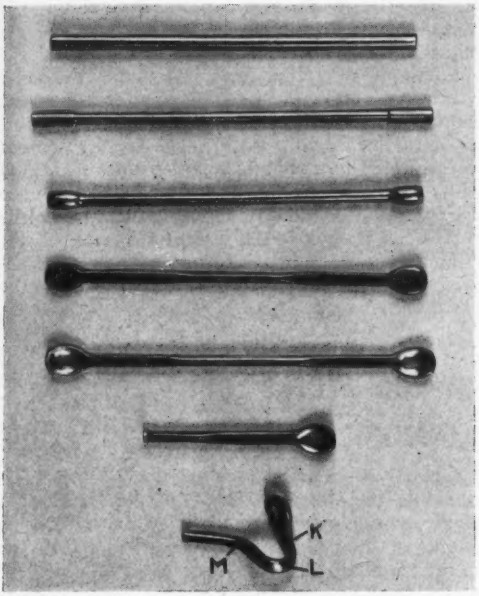



**Fig. 9. Pad-arm before and after bending, showing bends formed with the equipment illustrated in Fig. 8**

front face. Around one of these pins, located at the rotational centre, the shank is wrapped, to form the bend *L*, by movement of the second pin, the centre of which is positioned to correspond with that of the bend *M*. After the bend *L* has been completed, the end of the work projecting beyond the second pin comes in contact with a stationary block, and the bend *M*, Fig. 9, is thus produced. The angles of the bends *L* and *M* are determined by the setting of the stationary block and of a stop-pin *U*, which engages a flat face *V* machined on the handle of the mandrel *T*. The fixture described enables approximately 330 pieces to be bent per hour.

### HAND-BENDING EAR-LOOPS

Hand bending-blocks of a very simple type are employed for forming the ear-loops on temples for the Numont frames. Before the loops are formed, Xylonite coverings are applied to the ends. These coverings, which are termed "paddles," are made from rod, each piece being first drilled to receive the end of the temple, and parted-off to length. Before they are assembled to the temples, the lengths are ground to a tapered form on Scrivener centreless grinders. The end of the temple, after being coated with an adhesive, is inserted in the drilled bore, and the paddle is then flattened between heated dies. These dies at the same time impress shallow serrations on the inner face of each paddle.

After moulding, the ear-loops are bent by the use of blocks of the type shown in Fig. 10. Each block consists of a wooden body, to the upper surface of which is attached a brass plate, with a locating-cavity for the paddle. The bend-contour is controlled by the form of a curved step at the edge of the plate, and both cavity and step are highly polished. The paddles are warmed before bending, to soften the Xylonite. To form a bend the operator holds the paddle in the cavity with the left hand, as seen in Fig. 10 and rapidly draws the work round the register step with the fingers of the right hand. By this method, no difficulty is experienced in bending the compound structure of wire and Xylonite, and allowance for spring-back is made in the shape of the block.

The metal inserts for the Xylonite nose-pads are

**Fig. 10. Simple hand bending block for forming ear-loops on the temples after the Xylonite "paddles" have been applied. Bending is carried out warm**

among the very few details made by punching. They are first blanked from strip to a T-shape in a simple press-tool, and the cross-arm of each tee is then headed between flat dies. For this operation, the vertical arm of each tee is inserted in a hole in the lower die and the cross-arm is struck by the upper tool. In this way, the cross-arm is formed into a thin, flat, eliptical disc, to which the rectangular-section shank remains attached. These inserts are then cemented between strips of Xylonite which has previously been softened by damping it with acetone.

One strip is pierced with a series of holes for the shanks and the other is plain. The shanks are passed through the holes, adhesive is applied, and the plain strip is placed over the heads of the inserts.

Subsequently, the strips are cured under heat and pressure to bond them together, after which the outline of each pad is blanked out round the insert by means of a press-tool. The blanked pieces are moulded to a slightly rounded form in heated press-tools, and are finally barrelled to remove burrs, round off sharp corners, and polish the surfaces. They are then ready for assembly.

Some other operations on spectacle frame components will be described in a further article to be published shortly.

# Milling Die Blocks at the Works of Garringtons, Ltd., Bromsgrove

IN THE SHOPS devoted to the production and re-conditioning of forging dies at the Bromsgrove works of Garringtons, Ltd., cutters with throw-away blades, fitted with tungsten carbide, " utility " grade, inserts from the Coromant T-Max range marketed by Sandvik Swedish Steels, Ltd., Manor Lane, Halesowen, Birmingham, are extensively employed for face milling operations on die blocks. A close-up view of a vertical milling machine fitted with one of these cutters is given in the illustration.

Die blocks made from nickel-chrome steel of 55 to 60 tons per sq. in. tensile strength are machined in batches, and 0·372 in. of metal is removed from the 12- by 5½-in. top faces at a single pass, a table feed of 5 in. per min. being employed. By indexing and inverting the inserts in the blades, eight cutting edges can be presented to the work in turn, and a total of 288 die blocks can be face milled before it becomes necessary to discard the inserts.

At another operation, a 16-in. diameter face milling cutter fitted with 20 blades with T-Max throw-away inserts, is used for taking a ⅜-in. deep cut on nickel-chrome steel inserts for crankshaft dies, which have 34- by 10⅜-in. top faces and a tensile strength of 80 to 85 tons per sq. in. For this work a table feed of 6 to 8 in. per min. is employed.

**One of the face milling cutters fitted with Sandvik Coromant T-Max throw-away tips and holders, which are employed by Garringtons, Ltd., for machining die blocks**

Coromant T-Max inserts and blades are also used for face milling work-hardened die blocks in readiness for sinking fresh cavities. In this instance, $\frac{5}{16}$-in. deep cuts are taken on the blocks, and a table feed of 6 to 8 in. per min. is employed.

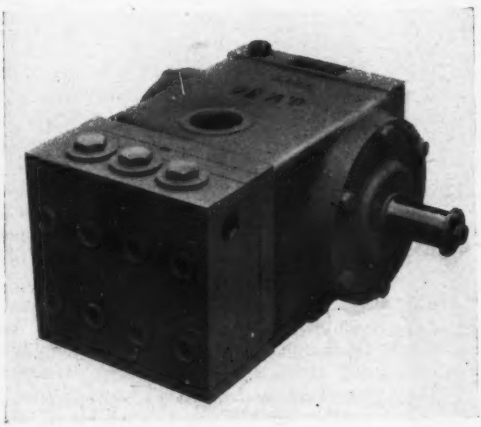
In addition, rough- and finish-turning operations are performed in the die-shop on parts made from nickel-chrome steels with tensile strengths ranging from 40 to 88 tons per sq. in., on Herbert type 12B turret lathes fitted with T-Max heavy-duty holders for throw-away tips, and on Herbert type 9B turret lathes with T-Max holders suitable for lighter duty. Both square and triangular tips are employed for negative rake turning on these lathes.

# Keelavite/Gury High Pressure Hydraulic Equipment

WORLD SELLING RIGHTS for a complete range of high pressure hydraulic equipment have recently been acquired by Keelavite Hydraulics, Ltd., Allesley, Coventry. Known as Keelavite/Gury, the equipment comprises a series of fixed-capacity piston pumps, and the complementary control valves for building complete hydraulic systems.

Pumps are available with either three or six pistons, which are operated by an eccentric mechanism, and a typical 3-piston pump, type GV.30, is seen in the accompanying illustration. The cylinder head incorporates valve gear to control the flow of oil in the unit, also a priming plug and a bleed plug which are used when the equipment is first put into operation. Machined from steel forgings, the pump bodies are available with foot or flange mounting arrangements. Pumps of either design are of generally similar dimensions, except for the mounting flange. The latter takes the form of a modified front bearing housing, and incorporates an oil tight seal so that pumps of this type can be mounted within an oil reservoir.

There are nine basic sizes of pump, but by variations of the piston diameter and stroke, a total of 22 different volumetric outputs can be obtained. Outputs range from 0·43 to 44 gal. per min. at 1,500 r.p.m. (0·28 to 29·64 gal. per min. at 1,000 r.p.m.), the corresponding output pressures being 5,700 and 1,500 lb. per sq. in. for continuous service at a speed of 1,500 r.p.m. For intermittent service, as required, for example, for presses, the output pressures range from 7,100 to 2,200 lb. per sq. in. It is stated that simplicity of design and the maintenance of high standards in the manufacture of the pumps results in a high volumetric efficiency (94 per cent average) and notable silence in operation. Pumps can be supplied as double units with different output rates.



**Foot-mounted type GV. 30 hydraulic piston pump from the new Keelavite/Gury range. Of 3-piston design, this unit has a maximum output of 5·73 gal. per min. at a speed of 1,500 r.p.m., and a delivery pressure of 7,100 lb. per sq. in. for intermittent applications**

The specially designed valves for use with Keelavite/Gury pumps have forged steel bodies to ensure long life at high operating pressures. Available in three sizes, the type TN directional valves are 4-port units, and can be supplied with any of five actuating arrangements—including hand lever, cam, and servo—which fulfil most directional control requirements. The port sizes of these valves are ½, 1 and 1¼ in. B.S.P., and the maximum flow rates are 10, 30 and 50 gal. per min. respectively.

A series of relief and off-loading valves is available, which, for economy in installation, have been designed as combination units. The type BVL is a main relief valve combined with a pilot valve, and four pressures are obtainable, depending upon the spring employed, namely, 550, 2,500, 4,500 and 7,000 lb. per sq. in. Valves can be supplied with ports of ½, 1, 1¼ and 2 in. B.S.P., with flow rates of 10, 30, 50 and 75 gal. per min., respectively. A type CO pilot valve, with ¼-in. B.S.P. ports, is available as a separate unit.

The type BVDCR combined off-loading and by-pass unit, incorporates a non-return valve, and is supplied in port sizes and pressure ratings similar to those of the type BVL. Type DR affords six different combinations of the types BVL and BVCDR valves. It can be employed with advantage to control the flow from a double pump unit, and then takes the place of four ordinary valves. The range of steel bodied valves will shortly be extended to include directional (with integral decompression valve), back pressure, pressure switch, pressure reducing, and pilot-operated decompression types.

For high pressure applications, the company has recently developed the KeelaRing fitting, which is now in production. This fitting is suitable for pressures up to 7,500 lb. per sq. in., and in smaller sizes, for pressures up to 10,000 lb. per sq. in. It is claimed that the unit is simple to fit, can be re-used repeatedly, and does not damage the associated tubing.

I

# New Hoover Washing-machine Production Facilities

To provide for the large-quantity production of the new Hoover Keymatic fully-automatic domestic washing-machine, some £2,000,000 has been expended in building and equipping a 110,000-sq ft. extension to the factory of Hoover (Washing Machines), Ltd., Merthyr Tydfil, Glamorgan, already stated to be the largest in Europe engaged exclusively in washing-machine manufacture. Features of the new plant include extensive press-work and metal-finishing sections. In the press shop, four press lines are devoted to the pressings for the inner and outer tub halves, and the main operations are performed on 200-ton triple-action machines. Part of the line for forming outer tubs is shown in Fig. 1. Before the sheet steel is delivered to the press-shop, it is coated with lubricating compound in a Drawcote (American) plant.

**Fig. 2. Extensive use is made of multiple-spot welding machines. This installation provides for welding the brackets to the outer tubs. The main machine for welding the base assembly completes 32 welds per cycle**

**Fig. 1. This press line is one of four installed for the production of inner and outer tub halves, and is devoted to outer tub components. The main operations are performed on 200-ton triple-action machines**

In the fabrication section, extensive use is made of spot-welding, and of a total of 34 spot-welding machines installed, 14 are of the multiple-spot type. Six of the multiple machines are incorporated in a line of 13 spot-welders employed for the assembly of the lower half of the outer tub, on which a total of 120 welds is required. A typical multiple-spot machine, which provides for welding the brackets to the outer tub, is shown in Fig. 2. In another line, for welding the base assembly, the main machine completes 32 welds at each cycle. A third line is devoted to the assembly of right- and left-hand frame-members, and in an adjacent section, another multiple-spot machine is installed for assembling the complete cabinet shell. Multiple-spot welding is also used on the door assembly.

Facilities for metal finishing include an automatic phosphating plant; three electrostatic paint spraying lines and a paint dipping plant; an Alochrome

plant for the anti-corrosion treatment of aluminium; and a special automatic spray pickling plant. All controls for this equipment are housed in a centralized control-room. The inner and outer tubs are porcelain enamelled, and for this purpose, the slurry is automatically sprayed. Spraying is followed by drying, after which the coating is fused by passing the work through a continuous furnace. Because of the unorthodox and somewhat complex design of the new product, it has been necessary to devise special assembly procedures and equipment. Assembly starts with the tub, which is held inverted in a pallet that also serves as a jig. At a later stage, a mechanical rig turns the work over, transfers it to another type of pallet, and returns the original pallet to

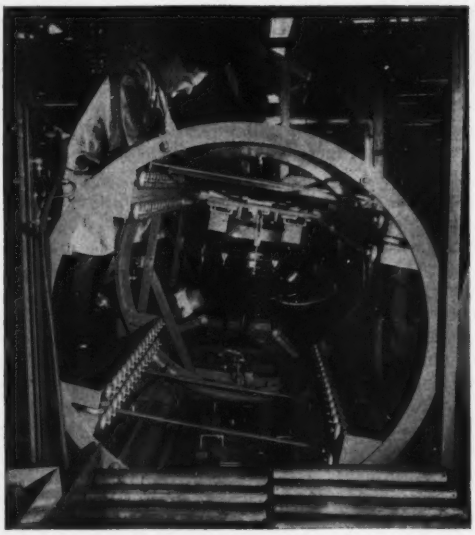
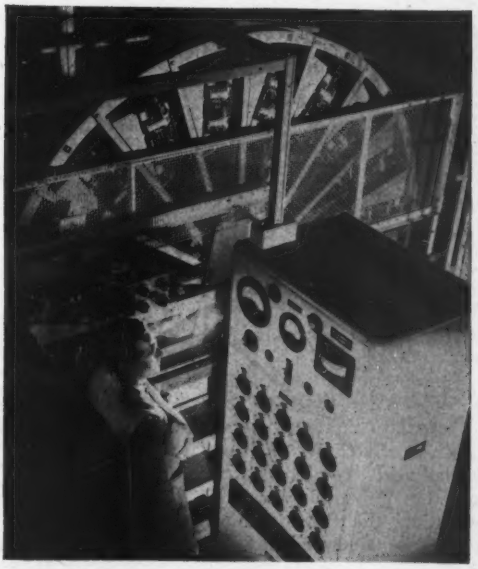


**Fig. 3. This turn-over rig, for water-testing completed tub assemblies, forms part of the equipment of the assembly lines**

the starting-point for reloading. Subsequently, turn-over rigs of the design shown in Fig. 3 are used to facilitate water-testing of the completed tubs before the frames are assembled round them. All electric wiring is completed after the front panels have been assembled, and before the rear panels are fitted, each unit is subjected to a comprehensive automatic test programme, in the conveyorized section shown in Fig. 4. Functions checked in this section include those of the automatic filling device and programming mechanism, and extensive electrical tests are also performed.

**Fig. 4. A comprehensive series of electrical and other checks is performed automatically on the assembled washing machines in this conveyorized test section**

**Fig. 5 (below). On this wheel-type running-in rig which is employed at the Cambuslang factory, pump-motors are run-in for 10 min. each. Two motors are unloaded every 40 sec.**



To facilitate final packaging, another turn-over fixture is used to turn the product through 90 deg., vertically and horizontally, before it is passed through an automatic banding machine.

Two electric motors are required for each Keymatic machine, and production lines for these motors have been laid down at the factory of Hoover (Electric Motors), Ltd., Cambuslang, Lanarkshire, at a tooling cost of £500,000. The efficiency of the methods there emloyed is such that the number of man-hours is approximately 1 per main motor, and slightly more than 0·4 per pump motor. A major factor in the attainment of this level of productivity is the provision of extensive facilities for automatic testing, which include the equipment shown in Fig. 5. Here, pump-motors are run-in for 10 min. each, and a pair of motors is unloaded every 40 sec. Subsequently, functional and electrical tests are carried out in a cycle-time of 35 to 40 sec. per motor, under simulated service conditions, with each motor coupled to the pump. Here again, testing is completely automatic, and provision is made for clearing all traces of water from the pump on completion of the test.

## Letters to the Editor

*[The Editor does not hold himself responsible for the views expressed by his correspondents.]*

### Milling Machine T-slots

[*To the Editor of* MACHINERY]

SIR,—May I clear up a point made in the editorial in MACHINERY, 98/407—22/2/61, on standardization of tooling areas on machines. It was suggested that there should be standardization of "the number, spacing and size of the T-slots in the table working surface. . . ."

In fact, this need was fully met as long ago as 1954 in the form of British Standard 2485.

One wonders how this existing standard which is widely known and used in the machine tool industry has come to be overlooked. Not only does B.S. 2485 cover all the points mentioned in your leading article, but it deals additionally with the dimensions and tolerance of tenon slots.

It is to the further credit of B.S. 2485 that it largely forms the basis of the international recommendation on T-slots shortly to be published by the International Standards Organization. On publication of this recommendation, the British Standard will need to be amended only in regard to minor details of tolerancing to bring British practice fully into line with international procedure.

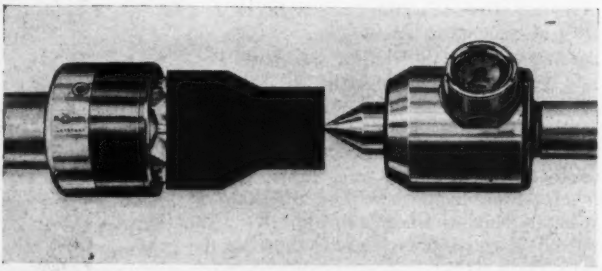
C. DOUGLAS WOODWARD,
Press and Public Relations Officer,
British Standards Institution.
London

* * *

[Whereas it is appreciated that B.S. 2485 specifies the nominal spacing of T-slots for the tables of milling machines of different sizes, the dimensions specified are "fractional", and do not bear any limits. In consequence, there could still be substantial variation in the T-slot pitch between one machine and another of a given table size, depending upon the general manufacturing tolerances adopted for fractional dimensions by the machine tool builder. It is always desirable to locate from opposite ends of the same T-slot for pendulum milling. Such a course is not always practicable, however, especially when different components are required to be machined at opposite ends of the table, and the difficulties outlined in the editorial to which reference is made above arose because different T-slots were employed for location purposes. Although the T-slots in the tables of a battery of milling machines, of the same make, had the same nominal pitch, the variations due to wide manufacturing tolerances were such as to prevent accurate alignment between the cutters of the composite gang and the different workpieces. The particular machine tool builder, we are informed, has now specified close limits for the pitch of the slots, in addition to those already specified for the width of the throat of each slot.—EDITOR.]

## Röhm Hydraulic Work Driver and Tailstock Centre

The hydraulic face-type work driver and the tailstock centre for a lathe, shown in the figure, are made by the German firm of Röhm, who are



**Röhm hydraulic work driver unit and tailstock centre for a lathe**

represented in this country by Michael S. Thompson, Ltd., 185 Hammersmith Road, London, W.6. This work driver assembly comprises a body, a detachable cone centre, and a self-contained hydraulic unit incorporating five high-speed steel plungers with knife-shaped ends, which are pressed into the end face of the work, under thrust applied by the tailstock centre, to take the drive when the lathe is in operation. A built-in dial-type gauge on the body of the tailstock centre affords a continuous indication of the thrust applied to the work. Hydraulic fluid within the work driver unit ensures that uniform pressure is applied by all the plungers, and provides for a self-adjusting action, so that the knife-shaped ends are pressed into the work by equal amounts, irrespective of any unevenness or inaccuracy in squareness of the work surface. When two screws in the hydraulic unit have been removed, the plungers can be withdrawn, without loss of fluid, in preparation for grinding the knife-shaped ends. Release of a cross screw in the body enables the centre to be removed for grinding.

The work driver assembly is available in five sizes which have body diameters from 1¾ to 4¾ in., and Morse taper shanks from No. 2 to No. 6. Three interchangeable hydraulic units can be supplied for use with each of the three smallest work drivers in the range, and four units for each of the larger sizes. The knife-edge ends of the plungers of these units are arranged within circles from ⅞ to 4¾ in. diameter. In addition, the range includes heavy-duty hydraulic work drivers, fitted with back plates, which are intended to be mounted on the nose ends of lathe spindles.

Five sizes of tailstock centres can be supplied, which have Morse taper shanks in sizes No. 2 to No. 6, and body diameters from 2 to 4¾ in. These units normally enable maximum end thrust forces ranging from 550 to 4,400 lb. to be applied to the work. The two largest sizes in the range are available in heavy-duty designs which have capacities for applying maximum thrust forces of 5,500 and 8,800 lb. to the work.

## Hertford Technical Enquiry Service

A new technical information service for industry has been inaugurated by the Hertfordshire County Council and is operated from the recently-opened Headquarters Library at Hatfield Technical College, Roe Green, Hatfield. For firms in Hertfordshire, the basic subscription to the service is £5 5s. a year, and for organizations beyond the county boundary, the charge is £20.

Subscribers receive each week information on newly-published literature on subjects which they have nominated, and an additional charge—usually 5s. a year—is made for each subject selected. Details are supplied of all new books, pamphlets, and reports, which are added to the stocks of the three county technical college libraries, and a comprehensive list of references to articles is also provided. Literature of interest may be borrowed and photocopies of articles can be supplied. The information to the subscriber is given on 5- by 3-in. cards, which may be filed as a permanent index. A very wide variety of subjects in science, technology, and management is covered.

In addition, subscribers may obtain advice in connection with specific problems and this service is not restricted to the subjects which they have nominated in connection with the card service. The specialist library staffs will be assisted by the academic staffs of the colleges in solving the more difficult problems submitted by enquirers.

Collections of publications which are available for reference include a set of British Standards, A.S.T.M. standards, Radio Component specifications, D.T.D. specifications, and patent abridgements.

## Use of Aluminium in Motor Car Engines

(*Continued from page* 523)

must be changed after 2,800 blocks, but for aluminium the number is increased to 13,400. Similarly, for drilling a ¾-in. diameter hole, 1·92 in. deep, the times required on cast iron and aluminium are 22 sec. and 11 sec., and the numbers of holes completed before changing the drill, 800 and 3,000.

Incidental advantages are also gained in the machine shop on account of the cleanness of die castings, and particularly freedom from sand, the comparative ease with which chips may be removed, and reductions in handling costs on account of lower weight.

It seems reasonable to assume, therefore, that within a fairly short period of time all round benefits will be gained from the widespread substitution of aluminium for cast iron in the production of major engine components.

## Trade Publications

HERBERT MORRIS, LTD., P.O. Box 7, Loughborough.—Booklet No. 242 includes numerous illustrations, with brief explanatory notes, of typical conveyor installations for a variety of purposes in different industries.

TUBE INVESTMENTS, LTD., The Adelphi, London, W.C.2. Publication entitled " This is TI Today " which enumerates the principal constituent companies in the various divisions, with details of their products.

# NEWS OF THE INDUSTRY

## *Manchester and District*

MITCHELL'S EMERY WHEEL CO., LTD., Openshaw, inform us that during recent months there has been a continued heavy call for their vitrified and resinoid-bonded abrasive wheels, which include types for surface, centreless and cylindrical grinding, cutting off, high-speed fettling, and carbide tool grinding. In addition, a large volume of orders is being received for the various mounted wheels and points in the company's range. We are informed that a new automatic, gas-fired, "top-hat" type kiln unit has recently been supplied and installed in the works by the Downson & Mason Gas Plant Co., Ltd. This kiln is suitable for vitrified wheels up to 36 in. diameter and comprises three base units and two top-hat sections, the latter being manipulated by a 10-ton overhead crane. In operation, one base unit is open for unloading and loading, while firing is in progress in the other two sections, so that continuous production is maintained.

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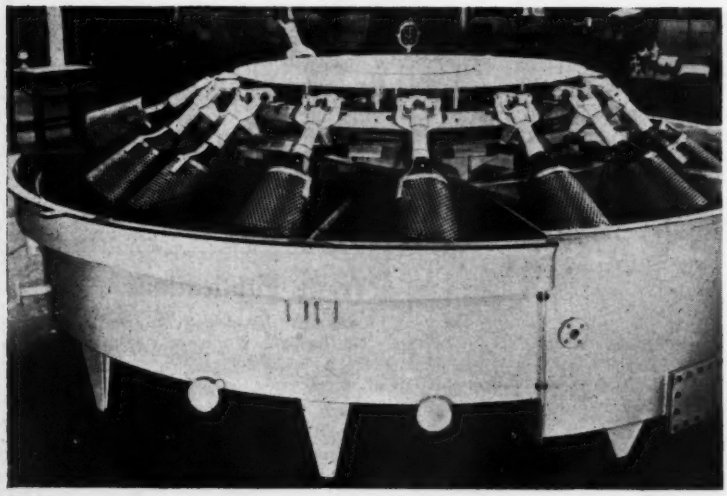
**Small parts are galvanized automatically with this rotary machine, which is made by F. Blasberg, Solingen-Merscheid, Germany. The cam-operated work buckets are mounted on a Roballo ball bearing slewing ring of 40 in. diameter, and are dipped into different baths during the galvanizing cycle**



BRAYSHAW FURNACES, LTD., Boundary Street, Manchester, 12, makers of furnaces and heat treatment plant, report that their works are busy with the construction of various types of standard units from their range. Work in progress includes a battery of rotary scroll type electric carburizing furnaces, also a number of shaker hearth electric furnaces.

It may be noted that this company recently completed an installation of furnaces at a Glasgow works comprising one vertical type hardening furnace with internal dimensions of 17 ft. 3 in. deep by 4 ft. 1¾ in. diameter, and three horizontal, re-circulation type, stress relieving and tempering furnaces, each 5 ft. 6 in. wide by 4 ft. deep by 15 ft. 6 in. long.

We are informed that a programme of development and modernization of designs is in progress and that new types now available include a twin-chambered high-speed steel hardening furnace of the gas-fired type which gives a maximum temperature of 1,400 deg. C.; a liquid bath furnace for use with fusible salts, including cyanide, or lead, made in four sizes, for a standard maximum temperature of 900 deg. F.; and a new electrode type salt bath hardening furnace for high-speed steel, in five sizes.

BRAYSHAW TOOLS, LTD., Boundary Street, Manchester, 12, report a continued heavy demand from both the home and export markets for all the tools and equipment in their range. We are informed that the re-

cently introduced Hi-Feed, serrated, heavy-duty milling cutters have been very well received.

DE BERGUE MACHINE TOOLS, LTD., Vaughan Street, West Gorton, are receiving a steady flow of orders for their punching and shearing machines and riveting machines. The company's design office is at present busy with the development of a new range of machines and equipment, which will include guillotine shearing machines with capacities from 6 ft. by ⅜ in. to 10 ft. by 1 in. A prototype of one of these machines is at present being built in the works, and we hope to describe them fully in a future issue.

KENDALL & GENT, LTD., Victoria Works, Gorton, are experiencing a continued flow of orders for their standard ranges of vertical milling machines and plano-milling machines, of both the double column and the open-side types. In addition, a number of enquiries has recently been received for special machines and equipment. Other activities of the company include the production of a range of screwing machinery, broaching machines, and milling cutters of both wedge inserted blade and inserted helical blade types.

EDWARD G. HERBERT, LTD., Atlas Works, Levenshulme, are busy with the production of their range of metal sawing machines for customers at home and overseas. A large volume of enquiries is at present being received for balancing machines, and there is a good demand for testing machines, especially, it is stated, from the educational authorities.

HERBERT HUNT & SONS, LTD., Elsinore Road, Old Trafford, Manchester, 16, inform us that the recent upward trend in the volume of orders is being maintained, and that all departments of the works are well occupied with the production of various machines and equipment, including tap-flute and drill-flute milling machines, drill grinders, and special machines.

THE CARBORUNDUM CO., LTD., Trafford Park, Manchester, 17, report that all sections of their works are kept busy in meeting the demand for the wide and varied range of abrasive products. This company has recently introduced to the market a number of new materials which have been developed by The Carborundum Company, Niagara Falls, N.Y., U.S.A. These materials can be supplied in many forms and are intended for the production of parts that are required to be resistant to attack by abrasion, chemicals, corrosion, nuclear radiation, and high temperatures. A comprehensive leaflet giving full information on these products, including composition and some typical applications, is now available from the company at the above address.

BENRATH MACHINE TOOLS, LTD., Empress Street, Cornbrook, Manchester, stockists and merchants of machine tools, small tools and engineering equipment, report a continuation of the recently increased demand for all the items which they handle. In addition to the above activities, this company builds special machine tools and prototypes, some of which are made to customers' drawings and specifications, and static and dynamic balancing machines, and operates a balancing service for the trade.

Contract machining work of many types is also undertaken, and we are informed that the works are at present producing a variety of components for numerous customers.

H. FORDSMITH, LTD., Hadfield Street, Cornbrook, Manchester, 16, are extremely busy on their full range of products which includes keys; cotters; collars; studs; and split and taper pins. We are informed that numerous orders are at present in hand for the Brixham trawl winch which this company makes for use in the fishing industry, and many of these are for export. An expansion and re-equipment scheme is now in progress in the works, and a number of automatic lathes has recently been installed.

BARLOW & CHIDLAW, LTD., Pendleton Gear Works, Grafton Street, Ellor Street, Salford, 6, report continued growth in the demand for their services as gear cutting specialists, from all branches of the engineering industry. Present capacity covers external spur gears up to 10 ft. diameter, double helical gears up to 86 in. diameter, and spur and helical racks up to 10 ft. long by 12 in. wide by 2 d.p.

Other work undertaken includes case hardening and heat treatment, sand-blasting, and flame hardening by the Shorter process.

To keep pace with the increasing flow of business, the company is to build a new works at Whit Lane, Pendleton. This factory will initially cover an area of some 80,000 sq. ft. The site has already been cleared and levelled, and it is hoped that the factory will be in production by mid-1962.

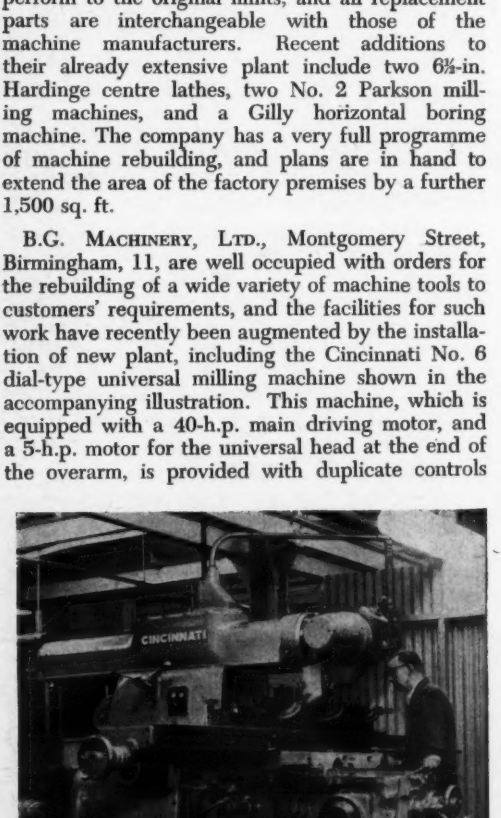
R. SUTCLIFFE.

## The Midlands

MELBOURNE ENGINEERING CO., LTD., Melbourne, Derbyshire, who have specialized for many years in the rebuilding of Brown & Sharpe, Index, C.V.A., and B.S.A. turret-type, single-spindle automatics, are now providing a similar service

for sliding-head machines, including Bechler, Petermann, Tornos and Wickman types. Rebuilding includes the complete stripping down, cleaning and inspection of machines, replacement of worn or defective parts with components to manufacturers' dimensions and specifications, re-assembly, painting, adjustment and testing. After rebuilding, all machines are guaranteed to perform to the original limits, and all replacement parts are interchangeable with those of the machine manufacturers. Recent additions to their already extensive plant include two 6½-in. Hardinge centre lathes, two No. 2 Parkson milling machines, and a Gilly horizontal boring machine. The company has a very full programme of machine rebuilding, and plans are in hand to extend the area of the factory premises by a further 1,500 sq. ft.

B.G. MACHINERY, LTD., Montgomery Street, Birmingham, 11, are well occupied with orders for the rebuilding of a wide variety of machine tools to customers' requirements, and the facilities for such work have recently been augmented by the installation of new plant, including the Cincinnati No. 6 dial-type universal milling machine shown in the accompanying illustration. This machine, which is equipped with a 40-h.p. main driving motor, and a 5-h.p. motor for the universal head at the end of the overarm, is provided with duplicate controls for feed and speed changes at the front and rear operating positions.




**An angular milling operation is here seen in progress on a Cincinnati No. 6 dial-type universal machine which is installed in the works of B. G. Machinery, Ltd.**

Longitudinal feeds to the 105-in. long table range from ¾ in. to 90 in. per min., and spindle speeds from 100 to 1,500 r.p.m. are obtainable. At the set-up shown, an angular face is being machined on a cross-slide strip for a Potter & Johnston 5D turret automatic. For this operation, the end-milling cutter is set at an angle of 55 deg. and is run at 100 r.p.m. with a feed of 6½ in. per min.

T. SMITTON & CO., LTD., Barclays Bank Buildings, Sheepcote Street, Birmingham, 15, inform us that increasing demands are being made on the facilities offered by their toolroom, which was established to undertake precision modifications to standard cutting tools for special applications, for example, combination drills, reamers, and cutter gangs, and the precision regrinding of production cutting tools in high-speed steel and tungsten carbide.

The range of engineers' small tools and equipment stocked and distributed by the company is being constantly extended, and it is stated that the call for drills, reamers, taps, cutters and slitting saws (of which the stock is comprehensive and highly specialized) is well maintained. In addition, there is a rapidly increasing request for all types of flat and circular thread rolling dies, threading dies, and machine keys, made by W. H. A. Robertson & Co., Ltd., Bedford, for whom the firm are sole Midland agents.

R. E. ORMEROD, LTD., Ednall Lane, Bromsgrove, Worcs., are at present very busy with the design and production of gravity- and pressure-type die casting dies, some of which are of exceptional size. The smallest dies may weigh less than 100 lb., whereas others may exceed 10 tons. A large die supplied by this firm, which weighed 5½ tons, was designed by H. J. Maybrey & Co., Ltd., London, S.E.26, for use in the production of aluminium castings (LM6) to house Sperry bearing repeater compasses for marine use. The die comprises three parts which are assembled around a $CO_2$ sand core, and the component weighs 100 lb., as cast, and 35 lb. when fettled.

An interesting die was constructed by the company for casting railway carriage doors, and another, of considerable complexity, for the production of oil pump bodies. The range of work handled includes dies for the production of parts in lead, zinc, aluminium, aluminium-bronze, and a number of magnesium-based alloys.

JONES & ATTWOOD, LTD., Stourbridge, Worcs., report a steady demand for their range of Worcester

bench presses which are available in various capacities up to 6 tons, and can be supplied with individual motors, or arranged for drive from line shafting. The presses are of robust construction and simple design, and adjustments can easily be made. Extra equipment available includes interlocking guards and strip feed units for coiled stock. The latest addition to the range of presses, of 6 tons rating, has a geared drive and can be equipped for dial feeding, for second operation work.

STAFFORD TOOL & DIE CO., LTD., have recently moved to larger premises at Gainsborough Works, St. Patrick's Place, Stafford. This move is the second that the company has had to make since it was founded in 1958, in order to meet the expansion of activities. Originally established to serve the boot and shoe industry, the company now also undertakes the production of jigs, fixtures, special tools, and machines.

F. W. HERRIDGE.

## Books Received

HEALTH AT WORK. Prepared by the Ministry of Labour and the Central Office of Information. 76 pp.

This booklet, which describes medical services in 14 British factories, is not on sale, but is being widely distributed to factory occupiers by H.M. Factory Inspectorate. It is concerned with such matters as the organization of factory medical services, the results achieved, the attitudes of workers to their introduction, and the advantages to be derived both by employer and worker. Following an introduction, a separate section is devoted to each of the 14 factories. Notes are included under such headings as: the factory; health hazards; the ambulance room; medical examinations; the doctor's functions; and costs.

DIRECTORY: MACHINERY, APPARATUS, TOOLS AND ATOMIC INDUSTRY—1960. Office for Industrial Information, 4 Tour-de-l'Ile, Geneva, Switzerland. 1,340 pp.

Now in its 27th edition, this international directory has indexes in French, German, English, Spanish, Italian, and Russian. Sections are devoted to machine tools metal forming machinery; sundry and special machinery; tools; apparatus; instruments; and parts, accessories, general supplies, and equipment.

In each section, the names of firms are given under towns which are arranged in alphabetical order under countries.

GETRIEBELEHRE. I—GEOMETRISCHE GRUNDLAGEN. By P. Grodzinski and G. Lechner. Walter De Gruyter & Co., Genthiner Strasse, 13, Berlin W35, 164 pp. [Price 3·6 D.M.]

This book is concerned with the kinematics of link motions and some higher couplings, which lead up to the fundamental theorems of gear transmission. The step-by-step exposition is thorough, starting with the notions of motion in a plane, and the derivation of velocity and acceleration, which are then applied to the 4-link kinematic chain, to cams, and to similar systems. A comprehensive introduction to uniplanar kinetics is thus provided, and the text is fully illustrated.

BIRMINGHAM AND WEST MIDLANDS CHAMBERS OF COMMERCE TRADES DIRECTORY, 1960/61. Birmingham Chamber of Commerce, 75 Harborne Road, Edgbaston, Birmingham, 15.

Details of goods made and services offered by members of the Birmingham, Dudley, Walsall, and Wolverhampton Chambers of Commerce are conveniently presented in this directory which extends to 350 large pages. The main introductory article—What Kind of a Place is Birmingham?—and the 2,456 headings in the classified trade index, are given in English, French, German and Spanish. Following this comprehensive and well arranged index, there is a list of member firms with a brief indication of the activities of each.

## Exhibition of Modern Metals

The International Nickel Co. (Mond), Ltd., Thames House, Millbank, London, S.W.1, will stage an exhibition of modern industrial metals at the Engineers' Club, Albert Square, Manchester, on March 18 and 20-22. Emphasis will be on the properties of nickel-containing materials and the platinum metals. Exhibits, displays, and demonstrations will be divided into sections concerned with: properties of metals at high, normal, and sub-zero temperatures; metals versus corrosion; metals for surface protection; metals with specific magnetic, expansion, or chemical properties; and methods of fabrication. Another important section will be devoted to nickel and chromium plating to the new British Standard.

Each day at 11 a.m. and 3 p.m. lectures will be given by members of the company's Development and Research Department, and films will be shown at other times.

## Creep Data

A Creep Information Centre has been established at the National Engineering Laboratory, East Kilbride, Glasgow, to enable data on the strength of materials for use at elevated temperatures to be made readily available to designers, from one source.

The Centre has been set up in response to requests from manufacturers and users of high-temperature materials, and it is hoped that it will become the national centre for information on the mechanical properties of materials for use at elevated temperatures.

Creep and rupture properties of conventional high-temperature materials are now being collected and tabulated and some British manufacturers have already sent details of their standard materials. In due course, high-temperature data for British materials will be issued in an agreed form, although commercial security may restrict publication of some of the data.

Later, it is hoped to extend the scheme to cover all mechanical properties of British materials for use at elevated temperatures, to collect details of testing machines and test procedures, and to obtain information about foreign materials and equipment.

# Industrial Notes

THE HOLMAN GROUP recently opened new Western Area offices at 8 King Street, Bristol.

THE TORRINGTON CO., LTD., Torrington Avenue, Coventry, inform us that an extension to their factory, which will be occupied by the Bearings Division, has recently been completed, and will enable production to be substantially increased.

THE INTERNATIONAL NICKEL CO. (MOND), LTD., is the new title which has been adopted by the organization formerly known as THE MOND NICKEL CO., LTD., an affiliate of The International Nickel Company of Canada. The address of the company is Thames House, Millbank, London, S.W.1.

H.N. ELECTRICAL SUPPLIES, LTD., Rochelle Works, Brixton Hill Place, London, S.W.2, who specialize in this field, have received an order for Crustex ultrasonic boiler descaling equipment which has been specified by the U.S.S.R. Government for the Scotch marine boilers to be installed in 15 Russian tankers under construction at Turku.

R. H. WINDSOR, LTD., Chessington, Surrey, have received an order from East Germany, valued at £53,000, for an AP335 injection moulding machine, which is the largest in their range. Weighing 73 tons, the AP335 machine has a capacity for moulding components with weights up to 210 oz., such as plastics refrigerator linings and radio cabinets.

H.M.K. SALES, LTD. [formerly Millspaugh (Canada), Ltd.] will in future control and promote the marketing in Canada of all the products of the Hadfields group of industrial companies. The sales staffs in Canada of the individual companies will continue to serve their customers within the framework of this organization, which has head offices at 3285 Cavendish Boulevard, Montreal.

THOMAS ROBINSON & SON, LTD., Rochdale, inform us that following a fire that recently destroyed their drawing office, a new research and development department, which is almost completed, is being employed temporarily as a drawing office. Because all drawings are photographed on completion, and prints are stored in a safe elsewhere, losses were confined to those that were in progress on the boards.

STEEL PRODUCTION IN U.S.S.R., it is reported, reached a record total of 65,300,000 tons in 1960, which represented an increase of more than 5,000,000 tons as compared with the figure for 1959. The 1960 tonnage represented approximately 6 cwt. per head of the population. By comparison it may be noted that production in the U.S.A. in 1960 amounted to 88,640,000 tons, in Western Germany to 33,550,000 tons, in the United Kingdom to 24,300,000 tons, and in Japan to 21,790,000 tons.

DORMAN MACHINERY SALES, LTD., Woodside Hill, Chalfont St. Peter, Bucks., have been appointed sole United Kingdom agents for the range of surface grinders, circular surface and cutter grinders for the metal-working and wood-working industries, built by Gustav Göckel, Germany. These surface grinders have stationary tables with length capacities from 3 to 24 ft., and reciprocating vertical spindle heads with grinding wheel drive motors up to 95 h.p.

GROUP STAND FOR MEXICAN EXHIBITION.—The Engineering Centre, Stephenson Place, Birmingham, 2, are making arrangements for a group stand at the "British Equipment for Mexican Industry" exhibition which is being jointly sponsored by The Dollar Exports Council and The Federation of British Industries, and will be held in Mexico City from September 29 to October 15, 1961. Companies interested in taking part in this group display should communicate with the general manager, Mr. A. J. Cox, at the above address.

THE 6TH INTERNATIONAL INSTRUMENT SHOW organized by B & K Laboratories, Ltd., 4 Tilney Street, London, W.1, will be held from June 19 to 23, on the company's premises. Products of more than 50 firms from 10 countries will be on view, and the exhibits will occupy a space of 2,500 sq. ft. Representative of the latest developments in the fields of instrumentation and electronics, these exhibits will be concerned, for example, with acoustic measurement, aircraft design, nuclear analysis, radar, automation, and quality control.

A STAINLESS STEEL EXHIBITION, sponsored by the Stainless Steel Manufacturers' Association, is being held at the Mayfairia Rooms, Marble Arch, London, W.1, from March 8 to May 4. Admission is free, and the exhibition is open from 10.30 a.m. to 6 p.m. More than 200 fabricating and manufacturing companies have lent products for exhibition, which are representative of the wide and growing field of application for stainless steel. In addition there will be displays and photographs to draw further attention to the technical advances of the industry.

THE CONVEYOR CONSTRUCTION & ENGINEERING CO., LTD., formerly of Eastbourne, has recently been incorporated in the Teleflex Group of companies, and the address is now P.O. Box No. 1, Basildon, Essex. In this connection it is pointed out that whereas the Teleflex overhead conveyors have a load rating of 100 lb. per carrier unit, the Conveyor Construction system is intended specifically for light industry and has a capacity of 25 lb. per carrier. Centre distance of carriers ranges from a minimum of 5 in. to a maximum of 20 in. For certain applications, loads up to 50 lb. can be handled by attaching each carrying fixture to two coupled roller-arm units.

DU PONT COMPANY (UNITED KINGDOM), LTD., 76 Jermyn Street, London, S.W.1, announce that the basic price of Delrin acetal resin is being reduced by 20 per cent. This material, it is claimed, offers a combination of properties which help to bridge the gap between metals and plastics, and it is believed that it will find many applications as a replacement for metal. At the new price, it is stated, the cost of Delrin will be almost exactly the same as that of zinc die casting alloy, on a price/volume basis, and one

half that of brass. As regards the cost of finished components the material may offer considerable advantage owing to ease of production, and the fact that little or no finishing is required.

## Opportunities for Research at NPL

A publication under this title has been issued by the National Physical Laboratory, Teddington, Middlesex, to draw attention to the nature of the research work that is currently in progress, and future objectives. Separate sections are devoted to the activities of the various Divisions and in each section reference is made to some aspects of the work that is at present being undertaken.

There is also a section which gives general information on the Laboratory and its activities, and here it is pointed out that the N.P.L. " is always on the look-out for able young scientists and can offer them a wide choice of interesting fields for research." In addition there are notes on qualifications for posts in the Scientific Civil Service, salary scales, post-graduate research fellowships, vacation students, and " guest " workers. Copies of the publication and other information are obtainable from The Director, at the above address.

## Coming Events

INSTITUTION OF PRODUCTION ENGINEERS. *Leeds Section.* March 20, at 7.30 p.m., at the Hotel Metropole, King Street, Leeds, 1; lecture on " Work Study," by G. A. Daniell. *Birmingham Graduate Section.* March 14, at 7 p.m., at the James Watt Institute, Great Charles Street, Birmingham; chairman's address on " Sporting Guns and their Production," by R. G. F. Lowe. *Edinburgh Section.* March 14, at 7.30 p.m., at the Chamber of Commerce, 25 Charlotte Square, Edinburgh; lecture on " Activity Sampling," by E. A. Tough. *Luton Section.* March 14, at 7.30 p.m., at Luton College of Technology (Room 233), Park Square, Luton; lecture on " Dynamic Testing of Machine Tools," by Prof. S. A. Tobias, D.Sc., Ph.D., M.A. *Reading Section.* March 16, at 7.30 p.m., at the New Basingstoke Technical College, Worting Road, Basingstoke; lecture on " Production Techniques in the Instrument and Telephone Industry," by H. A. Richardson.

## Personal

MR. JOHN HORN has relinquished his executive directorship of the Forgrove Machinery Co., Ltd., Leeds, but will retain his seat on the board for a further two years in an advisory capacity. He has been the company's works manager and works director for the past 28 years.

MR. CLIFFORD METCALFE, C.B.E., at his own request, will relinquish his position as managing director of E.M.I. Electronics, Ltd., Hayes, Middlesex, on July 1, but will remain a full-time director of Electric & Musical Industries, Ltd. He will be succeeded as managing director of EMI Electronics, Ltd., by MR. PERCY A. ALLAWAY.


### MACHINERY'S ENQUIRY BUREAU

**For many years MACHINERY has provided an enquiry service not only for subscribers and advertisers but for all engineers in need of such information as the names of makers—or their agents—of machines or equipment for performing particular operations, suppliers of various classes of material, firms with facilities for undertaking certain types of work, owners of trade names, and agents for foreign machine builders. If you have such a problem write (MACHINERY, Enquiry Bureau, Clifton House, 83-117 Euston Road, London, N.W.1) or telephone (Euston 8441, 2 lines). This service is, of course, entirely free.**

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## Matbro Machine Tool Agencies

Matbro Machine Tools, Ltd., Matbro House, Beddington Lane, Croydon, Surrey, inform us that they have taken over the sales representation in the United Kingdom for the following machine tools and allied products:

"*Precise*" power quills, grinder-millers, high r.p.m. milling machines, jig grinders, Autodrills, and rotary tools.

*Feinbau* precision finishing lathes.

*F.o.B.* thread cutting machines.

*Stephan* visible grinders.

*Suhner* high speed disc grinders.

*C.W.* portable keyway cutting heads and adjustable trepanning tools.

*Naxoflex* grinding discs and cutting-off wheels.

*Lorbur* tungsten carbide burrs.

*Erzett* rotary milled files.

*Kosmos* high speed mounted grinding points.

## New Appointments

The following new appointments have been announced:—

MR. A. W. THOMPSON, as sales manager of Snow & Co., Ltd., Stanley Street, Sheffield, 3.

MR. R. G. M. CAWSON as works manager of the Staines factory of Petters, Ltd., a member company of Hawker Siddeley Industries.

MR. J. CORBISHLEY, F.C.A., and MR. S. A. CLODD, M.I.Prod.E., to the board of Ekco Electronics, Ltd., Southend-on-Sea.

MR. S. KELLY as chief buyer of Carbodies, Ltd., Holyhead Road, Coventry. MR. J. E. SAMUELS will be responsible for stores and material control under the direction of Mr Kelly.

MR. P. LAMBEAT, A.M.I.Mech.E., as head of the Engineering Section of the British Steel Castings Research Association, 5 East Bank Road, Sheffield, 2.

MR. R. CRANE, as technical representative of the Automatics Division of Modern Machine Tools, Ltd., Coventry. Until recently, he was with Burton, Griffiths & Co., Ltd.

MR. T. V. EMMERSON, F.C.A., as deputy chairman of Chamberlain Consolidated, Ltd., 3 Buckingham Palace Gardens, London, S.W.1, the parent company of the Chamberlain Group of building, engineering and property companies.

MR. A. D. LIDDERDALE, M.I.Mech.E., M.I.Prod.E., as general manager of Leybold-Elliott, Ltd., Manor Way, Borehamwood, Herts., the company recently formed by Elliott Brothers (London), Ltd., a member of the Elliott-Automation Group, and Leybold of Cologne.

MR. JOHN A. CROFT, previously deputy chairman and managing director of Crofts Engineers (Holdings), Ltd., Thornbury, Bradford 3, as chairman of that company and the principal operating subsidiaries, including Crofts (Engineers) Ltd., and Carter Gears, Ltd.

MR. WILLIAM SWALLOW, who has been a member of the board of Vauxhall Motors, Ltd., Luton, since 1956, as chairman and managing director of the company, in succession to Mr. Philip Copelin. The latter is resigning these positions at the end of March in order to take up an appointment as manager of the New York, U.S.A., staff of General Motors Overseas Operations.

MR. J. W. HAIG-FERGUSON, M.A., A.M.I.Mech.E., A.M.I.E.E., A.M.I.Prod.E., as managing director of R. & J. Beck, Ltd., 68-71 Mortimer Street, London, W.1, one of the Griffin & George Group of companies.

MR. EDWARD J. SCOTT, who was formerly with Mountwoods (Grays), Ltd., as manager of the sheet metal working and fabricating section of John Whitehead Engineering (Willesden), Ltd., Central Road, Temple Fields, Harlow, Essex.

MR. C. N. GRAYLING, 12 Queen's Court, Wembley, as London and Home Counties representative for L. & T. I. Brock & Co., Ltd., Burnsall Road, Coventry, for the sale of the company's products which include needle roller assemblies, rollers and pins, and cam followers.

MR. D. EDMUNDSON, general manager of the Rugby Works of A.E.I.(Rugby), Ltd., as manufacturing manager A.E.I. Electronic Apparatus Division, to fill the position occupied by the late Mr. E. T. W. Barnes, and MR. G. P. THOMPSON, until recently manager of manufacturing at Rugby, as manager, Rugby Works.

MR. L. R. PIPER, as technical sales and service engineer for the southern region of the United Kingdom for Ringway Machine Tools, Ltd., 42 Barton Arcade, Deansgate, Manchester, 3, agents for Heid copying lathes, tracer control units, and electro-magnetic clutches. He was previously a service engineer for the Elgar Machine Tool Co., Ltd.

## Scrap Metals

MIDLANDS.—Markets in general are good, but tonnages are still below average as the effects of improved working hours in the car industry are not yet fully apparent. It is expected that the next few weeks will show a substantial improvement.

Local steelworks are accepting unlimited deliveries of grades No. 1 and 2 heavy steel, grade No. 3 medium wrought iron and steel, and grade No. 4 compressed bales. This demand is being met mainly from local yards, and merchants are therefore keen to secure all oversize steel scrap and light steel cuttings to replace diminishing stocks.

The foundries have been pressing for increased supplies of cast iron scrap for many months and as a result prices have improved by as much as 20s. per ton. There are indications that the peak has now been reached in the demand for machinery quality scrap, as some local foundries have applied allocations or even temporarily suspended deliveries. Light cast material is still urgently wanted.

Markets for chipped steel turnings forwarded by rail are restricting deliveries, but with few exceptions road deliveries are continuing. Bushy turnings are difficult to place locally because allocations for one blast furnace have been reduced.

Bar ends and mild steel plate cuttings can be delivered to local foundries together with general short heavy steel scrap. Prices vary according to quality.

Light pressing scrap, such as tins, drums, light iron and light steel, is accepted at local yards at varying prices.

## Machine Tool Share Market

Stock markets were very active during the period under review, but after being firm for the most part, they became irregular, and most sections finished on a dull note.

British funds and similar gilt-edged stocks were lower on balance. Commercial and industrial share markets were bright, despite some irregularity in price movements. The trend, for the most part, was towards higher levels, and many good features developed.

Among machine tool issues, Edgar Allen advanced 1s. 3d. to 41s. 6d.; Birmingham Small Arms, 1s. to 32s. 6d.; Broom & Wade, 1s. to 25s. 9d.; Chas. Churchill, 1⅛d. to 10s. 3d.; Coventry Gauge & Tool, 2s. 1½d. to 29s. 1½d.; Craven Bros. (Manchester), 3d. to 10s. 7½d.; Expert Tool, 3d. to 2s. 9d.; John Harper, 1½d. to 8s. 3d.; A. A. Jones & Shipman, 3s. 9d. to 36s. 3d.; H. W. Kearns, 3s. 9d. to 22s. 6d.; Newall Engineering, 6d. to 8s.; W. E. Norton (Hldgs.), 4½d. to 4s. 6d.; Samuel Osborn, 2s. to 48s.; F. Pratt, 1s. to 16s. 6d.; Ambrose Shardlow, 2s. 6d. to 48s. 9d.; John Shaw & Sons (Wolverhampton), 1½d. to 16s. 10½d.; Sheffield Twist Drill, 9d. to 17s. 3d.; W. E. Sykes, "B," 6d. to 24s. 6d.; and Thos. W. Ward, 3s. 9d. to 73s. 9d. On the other hand, British Oxygen lost 6d. at 30s.; Geo. Cohen, 3d. at 13s.; and Kerry's (Gt. Britain), 6d. at 10s. 6d.

BROOKE TOOL MANUFACTURING CO., LTD.—Final dividend 5 per cent, making, with the interim, a total distribution of 10 per cent for the year to September 30, last.

CLARKSON (ENGINEERS), LTD.—Final dividend 12½ per cent, making a total distribution of 20 per cent, on increased capital, for year to November 30.

WILLSON LATHES, LTD.—Interim dividend 5 per cent.

## Obituary

MR. J. V. WINCHESTER, general manager of Whittam & Co., Pendleton, Salford, 6, died on February 27. He had served the company for many years.

MR. ROBERT R. STOCKFIS died suddenly on February 27 at the age of 63. He was founder and chairman of Robert R. Stockfis (Manchester), Ltd., Ardwick, Manchester, 12; Northern Caravan Distributors, Ltd.; and of Summerdale Caravans, Ltd.

## Correction

In the advertisement for Slack & Parr, Ltd., Kegworth, Nr. Derby, which appears on page 96 of this issue of MACHINERY, the material mentioned should be "martensitic stainless steel."

| COMPANY | | Denom. | Middle Price |
|---|---|---|---|
| Abwood Machine Tools, Ltd. | Ord. | 1/- | 1/3 |
| Allen (Edgar) & Co., Ltd. | Ord. | £1 | 41/6 |
| " " " | 5% Prf. | £1 | 14/ * |
| Arnott & Harrison, Ltd. | Ord. | 4/- | 13/6 |
| Asquith Machine Tool Corp., Ltd. | Ord. | 5/- | 12/6 |
| " " " | 6% Cum. Prf. | £1 | 16/3 |
| Birmingham Small Arms Co., Ltd. | Ord. | 10/- | 32/6 |
| " " " | 5% Cum. "A" Prf. | £1 | 14/6 |
| " " " | 6% Cum. "B" Prf. | £1 | 16/6 |
| " " " | 4% 1st Mort. Deb. | Stk. | 90½ |
| British Oxygen Co., Ltd. | Ord. | 5/- | 30/- |
| " " " | 6% Cum. Prf. | £1 | 20/6 |
| Brooke Tool Manufacturing Co., Ltd. | Ord. | 5/- | 7/4½ |
| Broom & Wade, Ltd. | Ord. | 5/- | 25/9 |
| " " | 6% Cum. Prf. | £1 | 17/- |
| Brown (David) Corporation, Ltd. | 5½% Cum. Prf. | £1 | 16/- |
| Buck & Hickman, Ltd. | 6% Cum. Prf. | £1 | 17/- |
| Butler Machine Tool Co., Ltd. | Ord. | 5/- | 17/6 |
| " " " | 5% Cum. Prf. | £1 | 14/3 |
| Churchill (Charles) & Co., Ltd. | Ord. | 2/- | 10/3 |
| " " " | 6% Cum. Prf. | £1 | 25/9‡ |
| Churchill Machine Tool Co., Ltd. | Ord. | 5/- | 39/6 |
| " " " | 6% Cum. Prf. | £1 | 17/6 |
| Clarkson (Engrs.), Ltd. | Ord. | 5/- | 28/9 |
| Cohen (George), 600 Group, Ltd. | Ord. | 5/- | 13/- |
| " " " | 4½% Cum. Prf. | £1 | 13/- |
| Coventry Gauge & Tool Co., Ltd. | Ord. | 10/- | 29/1½ |
| " " " | 5% Cum. Red. Prf. | £1 | 16/3 |
| Craven Bros. (Manchester), Ltd. | Ord. | 5/- | 10/7½ |
| Elliott (B.) & Co., Ltd. | Ord. | 1/- | 3/1½ |
| " " | 4½% Red. Cum. Prf. | £1 | 13/- |
| Expert Tool & Case Hardening Co., Ltd. | Ord. | 2/- | 2/9 |
| Firth Brown Tools, Ltd. | 4% Cum. Prf. | £1 | 11/- |
| Greenwood & Batley, Ltd. | Ord. | 10/- | 24/9 |
| Harper (John) & Co., Ltd. | Ord. | 5/- | 8/3 |
| " " | 4½% Red. Cum. Prf. | £1 | 12/3 |
| Herbert (Alfred), Ltd. | Ord. | £1 | 65/- |
| Holroyd (John) & Co., Ltd. | "A" Ord. | 5/- | 16/3 |
| " " " | "B" Ord. | 5/- | 16/3 |
| Jones (A. A.) & Shipman, Ltd. | Ord. | 5/- | 36/3 |
| " " " | 7% Cum. Prf. | 5/- | 4/9 |
| Kearney & Trecker-C.V.A., Ltd. | 5½% Red. Cum. Prf. | £1 | 11/- |
| " " " | Prefd. Ord. | £1 | 13/9 |
| Kearns (H. W.) & Co., Ltd. | Ord. | 5/- | 22/6 |
| Kerry's (Gt. Britain), Ltd. | Ord. | 5/- | 10/6 |
| Macready's Metal Co., Ltd. | Ord. | 5/- | 16/- |
| Martin Bros. (Machinery), Ltd. | Ord. | 2/- | 2/- |
| Massey (B. & S.), Ltd. | Ord. | 5/- | 10/6 |
| Newall Engineering Co., Ltd. | Ord. | 2/- | 8/- |
| Newman Industries, Ltd. | Ord. | 2/- | 5/3 |
| " " | 6% Prf. Ord. | 5/- | 5/- |
| Noble & Lund, Ltd. | Ord. | 2/- | 5/6 |
| Norton, W. E. (Holdings), Ltd. | Ord. | 2/- | 4/6 |
| Osborn (Samuel) & Co., Ltd. | Ord. | 5/- | 48/- |
| " " " | 5½% Cum. Prf. | £1 | 25/- |
| Pratt (F.) & Co., Ltd. | Ord. | 5/- | 16/6 |
| Sanderson Kayser, Ltd. | Ord. | 10/- | 37/6 |
| " " " | 6½% Cum. Prf. | £1 | 18/- |
| Scottish Machine Tool Corporation Ltd. | Ord. | 4/- | 10/- |
| Shardlow (Ambrose) & Co., Ltd. | Ord. | £1 | 48/9 |
| Shaw (John) & Sons, Wolverhampton, Ltd. | Ord. | 5/- | 16/10½ |
| Sheffield Twist Drill & Steel Co., Ltd. | Ord. | 4/- | 17/3 |
| " " " | 5% Cum. Prf. | £1 | 13/9 |
| Stedall & Co., Ltd. | Ord. | 5/- | 8/9 |
| Sykes (W. E.), Ltd. | "B" non-voting Ord. | 10/- | 24/6 |
| Tap & Die Corporation, Ltd. | Ord. | 5/- | 15/3xd |
| " " " | 4½% Deb. 1961-1977 | Stk. | 84½ |
| Wadkin, Ltd. | Ord. | 10/- | 20/- |
| Ward (Thos. W.), Ltd. | Ord. | £1 | 73/9 |
| " " | 5% Cum. 1st Pref. | £1 | 14/- |
| " " | 5% Cum. 2nd Pref. | £1 | 22/- |
| Willson Lathes, Ltd. | Ord. | 1/- | 3/4½ |

The Middle Prices given in the list are in several cases nominal prices only and not actual dealing prices. Every effort is made to ensure accuracy, but no liability can be accepted for any error. * Sheffield price. ‡ Birmingham price.

## BRITISH MACHINE TOOL

### Exports of New Machine Tools

| Countries | Bar and Chucking Automatics | | Vertical Boring Machines | | Other Boring Machines | | Drilling Machines | | Gear-cutting Machines | | Grinding, Lapping and Honing Machines | | Capstan and Turret Lathes | | Other Lathes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ |
| *Commonwealth* | | | | | | | | | | | | | | | | |
| South Africa | — | — | 252 (2) | 61,53 | — | — | 383 (31) | 10,330 | 79 (1) | 1,090 | 209 (43) | 6,819 | 393 (6) | 14,115 | 379 (10) | 13,138 |
| India | — | — | 2,340 (7) | 200,90 | 143 (7) | 10,248 | 282 (5) | 9,349 | — | — | 493 (18) | 19,543 | 666 (8) | 21,859 | 311 (7) | 10,551 |
| Pakistan | — | — | — | — | 9 (1) | 640 | — | — | — | — | 27 (5) | 2,289 | — | — | — | — |
| Australia | 39 (1) | 1,796 | 246 (2) | 8,268 | 1,011 (6) | 24,789 | 695 (21) | 19,545 | 634 (1) | 32,100 | 579 (34) | 25,136 | 1,134 (28) | 40,014 | 1,074 (50) | 43,366 |
| New Zealand | — | — | — | — | — | — | 64 (2) | 541 | — | — | 99 (32) | 3,646 | 289 (7) | 12,685 | 280 (29) | 10,921 |
| Canada | — | — | 251 (2) | 6,003 | 280 (1) | 8,118 | 173 (13) | 4,490 | — | — | 426 (41) | 20,617 | 103 (3) | 5,109 | 894 (42) | 32,753 |
| Miscellaneous | — | — | 21 (2) | 734 | 176 (4) | 3,189 | 64 (22) | 2,601 | — | — | 87 (20) | 4,626 | 76 (1) | 3,183 | 685 (27) | 21,624 |
| *Foreign* | | | | | | | | | | | | | | | | |
| Soviet Union | — | — | — | — | — | — | — | — | 106 (6) | 8,927 | 573 (11) | 48,561 | — | — | — | — |
| Sweden | — | — | — | — | 38 (4) | 3,422 | 244 (1) | 4,283 | — | — | 97 (2) | 2,882 | 444 (11) | 22,367 | 15 (15) | 741 |
| Norway | — | — | — | — | — | — | 249 (3) | 3,306 | — | — | 8 (1) | 117 | — | — | 37 (4) | 1,502 |
| Denmark | 74 (1) | 3,311 | — | — | — | — | 4 (4) | 120 | — | — | 47 (2) | 2,192 | 197 (8) | 10,755 | 44 (9) | 1,474 |
| Western Germany | — | — | 141 (2) | 4,356 | 16 (1) | 1,200 | 23 (14) | 526 | — | — | 148 (14) | 15,870 | 111 (3) | 4,380 | 441 (35) | 18,823 |
| Netherlands | — | — | — | — | 2 (1) | 312 | 148 (4) | 2,262 | 13 (1) | 1,308 | 88 (7) | 4,584 | 298 (9) | 9,744 | 66 (5) | 2,327 |
| Belgium | — | — | — | — | 36 (1) | 2,905 | 85 (13) | 2,249 | 109 (4) | 4,953 | 5 (1) | 350 | 334 (6) | 10,225 | 125 (12) | 3,430 |
| France | 440 (2) | 12,622 | — | — | — | — | 114 (4) | 4,687 | 316 (10) | 19,340 | 373 (9) | 22,198 | 95 (1) | 3,860 | 244 (12) | 7,939 |
| Switzerland | — | — | — | — | 72 (2) | 4,996 | 110 (4) | 4,288 | — | — | 135 (2) | 7,098 | 356 (23) | 18,732 | 76 (15) | 1,430 |
| Spain | — | — | — | — | — | — | 13 (1) | 666 | 56 (2) | 2,965 | 569 (11) | 13,616 | 790 (7) | 30,488 | 33 (1) | 3,014 |
| Italy | 764 (4) | 47,929 | — | — | — | — | — (1) | 80 | — | — | 347 (25) | 25,477 | 45 (1) | 2,445 | 957 (14) | 41,146 |
| US America | 289 (2) | 12,851 | 26 (2) | 2,000 | 42 (3) | 1,761 | 143 (7) | 5,297 | — | — | 520 (24) | 21,555 | 325 (7) | 17,226 | 2,327 (131) | 71,450 |
| Miscellaneous | 142 (1) | 8,757 | 2 (1) | 325 | 430 (20) | 21,284 | 684 (52) | 20,086 | 541 (3) | 53,638 | 1,263 (52) | 60,177 | 739 (16) | 33,895 | 850 (61) | 29,834 |
| Total | 1,748 (11) | 87,266 | 3,279 (20) | 228,744 | 2,255 (51) | 82,864 | 3,478 (202) | 94,706 | 1,854 (28) | 124,321 | 6,093 (354) | 307,353 | 6,395 (145) | 261,082 | 8,748 (479) | 315,463 |

Total exports of reconditioned machine tools: Quantity: No., 215; Weight, 12,689 cwt.; Value, £137,647
Total exports of imported machine tools: Quantity: Weight, 1,110 cwt.; Value, £49,387

### Imports of New Machine Tools

| Country of Origin | Bar and Chucking Automatics | | Vertical Boring Machines | | Other Boring Machines | | Drilling Machines | | Gear-cutting Machines | | Grinding, Lapping and Honing Machines | | Capstan and Turret Lathes | | Other Lathes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ |
| Sweden | — | — | — | — | — | — | 37 (7) | 942 | 40 (1) | 2,077 | 463 (13) | 29,971 | — | — | 40 (7) | 1,691 |
| Western Germany | 164 (3) | 7,817 | — | — | 1,619 (5) | 46,801 | 121 (35) | 4,882 | 133 (3) | 10,459 | 2,856 (49) | 116,682 | 262 (9) | 17,739 | 724 (16) | 37,151 |
| France | — | — | — | — | — | — | — | — | — | — | — | — | 38 (1) | 1,836 | 376 (5) | 14,741 |
| Switzerland | 169 (10) | 19,586 | 105 (2) | 9,041 | 3 (1) | 842 | — (1) | 253 | 149 (10) | 14,484 | 259 (22) | 23,975 | 387 (8) | 35,734 | 79 (8) | 12,090 |
| US America | 1,109 (4) | 45,078 | — | — | 779 (3) | 30,577 | 8 (1) | 1,207 | 2,555 (21) | 193,709 | 2,112 (40) | 211,160 | 21 (1) | 5,658 | 1,607 (8) | 115,374 |
| Miscellaneous | — | — | 120 (1) | 4,367 | 684 (3) | 14,615 | 275 (21) | 10,255 | 34 (1) | 824 | 509 (34) | 21,767 | 97 (2) | 5,826 | 1,018 (79) | 28,153 |
| Total | 1,442 (17) | 72,481 | 225 (3) | 13,408 | 3,085 (12) | 92,835 | 441 (65) | 17,539 | 2,911 (36) | 221,553 | 6,199 (158) | 403,555 | 805 (21) | 66,793 | 3,844 (123) | 209,200 |

Total imports of reconditioned machine tools: Quantity: No., 80; Weight, 3,530 cwt.; Value, £62,497.

## IMPORTS AND EXPORTS (Classified)

### and Parts during November, 1960

| Milling Machines | | Presses | | Sheet Metal-working Machines | | Sawing Machines | | Screwing and Threading Machines | | Planing, Shaping and Slotting Machines | | Unit transfer Machines and Heads | | Other Machines | | Machine Tool Parts* | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. | Value £ | Quantity. Cwt. and No. | Value £ |
| 300 (2) | 12,913 | 92 (5) | 2,336 | 483 (7) | 24,745 | 34 (5) | 869 | 78 (3) | 3,434 | 43 (2) | 799 | 3 (1) | 123 | 206 (16) | 6,757 | 345 | 17,938 | 3,279 (134) | 121,559 |
| 350 (6) | 15,405 | 1,247 (9) | 24,676 | 1,633 (16) | 75,708 | 22 (1) | 391 | 78 (3) | 7,257 | 58 (1) | 1,781 | — | — | 3,683 (16) | 206,125 | 1,716 | 73,276 | 13,022 (104) | 677,074 |
| 2 (1) | 230 | 7 (1) | 131 | 1 (2) | 198 | 23 (2) | 614 | — | — | — | — | — | — | 67 (1) | 1,740 | 6 | 930 | 142 (13) | 6,772 |
| 846 (28) | 39,948 | 4,466 (13) | 104,654 | 419 (66) | 12,111 | 59 (3) | 1,557 | 223 (13) | 13,680 | 592 (32) | 17,059 | 212 (1) | 10,421 | 364 (9) | 13,542 | 4,786 | 147,258 | 17,379 (308) | 555,244 |
| 356 (9) | 11,131 | 226 (10) | 5,470 | 308 (7) | 6,948 | 40 (6) | 890 | 102 (2) | 4,518 | 59 (2) | 1,361 | — | — | 614 (9) | 21,101 | 203 | 6,845 | 2,640 (115) | 86,057 |
| 122 (3) | 4,116 | — | — | 390 (32) | 8,354 | 30 (2) | 1,581 | — | — | 74 (4) | 1,601 | — | — | 103 (2) | 3,721 | 184 | 8,450 | 2,940 (145) | 104,913 |
| 16 (4) | 1,214 | 157 (8) | 3,985 | 117 (34) | 5,684 | 23 (5) | 522 | — | — | 36 (2) | 727 | — | — | 190 (18) | 8,602 | 317 | 14,964 | 1,965 (147) | 71,655 |
| — | — | — | — | 208 (3) | 18,906 | — | — | — | — | — | — | — | — | — | — | — | — | 887 (20) | 76,394 |
| 145 (2) | 6,890 | 3,458 (21) | 81,045 | — | — | — | — | 71 (3) | 6,043 | — | — | 2 (2) | 848 | 2,772 (27) | 68,402 | 77 | 7,160 | 7,363 (88) | 204,083 |
| — | — | 159 (1) | 11,607 | — | — | — | — | — | — | 18 (1) | 333 | — | — | 1 (3) | 132 | 52 | 2,757 | 524 (13) | 19,754 |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 78 | 3,398 | 444 (24) | 21,250 |
| — | — | — | — | 150 (1) | 4,450 | — | — | 37 (2) | 4,829 | — | — | — | — | 756 (66) | 31,345 | 80 | 8,609 | 1,903 (138) | 94,388 |
| 90 (4) | 3,702 | 336 (7) | 11,056 | 100 (1) | 2,929 | — | — | 16 (2) | 1,419 | — | — | — | — | 1 (2) | 45 | 125 | 6,458 | 1,283 (43) | 46,146 |
| 67 (2) | 1,498 | — | — | 12 (1) | 316 | — | — | — | — | — | — | — | — | 351 (1) | 15,819 | 162 | 12,290 | 1,286 (41) | 54,035 |
| 166 (7) | 5,785 | 38 (8) | 1,540 | 45 (1) | 1,618 | 12 (1) | 698 | 20 (1) | 1,603 | 163 (2) | 6,351 | — | — | 364 (8) | 17,979 | 294 | 14,957 | 2,684 (66) | 121,177 |
| 455 (4) | 24,306 | — | — | — | — | — | — | — | — | 15 (2) | 305 | — | — | — | — | 45 | 3,005 | 1,264 (52) | 64,160 |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | 70 (1) | 3,306 | 15 | 2,367 | 1,546 (23) | 56,422 |
| 326 (2) | 17,013 | 1,103 (4) | 24,397 | 313 (1) | 7,841 | — | — | — | — | — | — | — | — | 50 (1) | 4,092 | 38 | 3,243 | 3,943 (53) | 173,663 |
| 73 (5) | 2,639 | — | — | — | — | — | — | — | — | 112 (6) | 3,173 | — | — | 25 (10) | 3,108 | 394 | 20,141 | 4,276 (197) | 161,201 |
| 550 (10) | 21,002 | 3,333 (12) | 62,090 | 878 (8) | 27,352 | 87 (9) | 2,783 | 62 (4) | 7,148 | 269 (10) | 12,024 | — | — | 933 (31) | 47,148 | 442 | 30,237 | 11,205 (290) | 437,780 |
| 3,864 (89) | 167,792 | 14,622 (99) | 332,987 | 5,057 (180) | 197,160 | 330 (34) | 9,905 | 687 (33) | 49,931 | 1,439 (64) | 45,514 | 217 (4) | 11,392 | 10,550 (221) | 452,964 | 9,359 | 384,283 | 79,975 (2,014) | 3,153,727 |

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

### and Parts during November, 1960

| Milling Machines | | Presses | | Sheet Metal-working Machines | | Sawing Machines | | Screwing and Threading Machines | | Planing, Shaping and Slotting Machines | | Unit Transfer Machines and Heads | | Other Machines | | Machine Tool Parts* | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. and No. | Value £ | Quantity. Cwt. | Value £ | Quantity. Cwt. and No. | Value £ |
| 176 (7) | 8,248 | 134 (2) | 7,624 | — | — | — | — | — | — | 12 (9) | 777 | — | — | 20 (2) | 1,155 | 60 | 6,977 | 982 (48) | 59,462 |
| 721 (20) | 33,519 | 1,077 (16) | 23,666 | 668 (43) | 22,809 | 334 (41) | 9,992 | 97 (17) | 6,502 | 194 (9) | 7,957 | 18 (1) | 14,323 | 948 (57) | 52,210 | 494 | 37,297 | 10,430 (324) | 449,806 |
| 293 (8) | 14,598 | 210 (3) | 6,743 | 231 (4) | 8,698 | — | — | 154 (1) | 9,032 | — | — | — | — | 28 (11) | 3,633 | 70 | 8,427 | 1,400 (33) | 67,708 |
| 519 (10) | 26,599 | 357 (3) | 10,556 | 26 (9) | 1,587 | — | — | 65 (3) | 6,905 | 30 (2) | 1,521 | 1 (1) | 280 | 127 (8) | 12,041 | 123 | 28,151 | 2,399 (98) | 203,645 |
| 506 (8) | 38,914 | 9,460 (26) | 279,159 | 124 (19) | 23,940 | — | — | 165 (7) | 19,606 | — | — | — | — | 767 (45) | 51,926 | 1,706 | 197,176 | 20,919 (183) | 1,213,484 |
| 1,228 (30) | 34,532 | 1,899 (34) | 30,259 | 489 (19) | 19,384 | 396 (41) | 7,901 | 103 ( 3) | 7,176 | — | — | — | — | 210 (29) | 18,320 | 841 | 21,472 | 7,903 (297) | 224,851 |
| 3,443 (83) | 156,410 | 13,137 (84) | 358,007 | 1,538 (94) | 76,418 | 730 (82) | 17,893 | 584 (31) | 49,221 | 236 (20) | 10,255 | 19 (2) | 14,603 | 2,100 (152) | 139,285 | 3,294 | 299,500 | 44,033 (983) | 2,218,956 |

Figures in parentheses denote number of machines. * Not including machine tool cutting parts.

# PRICES OF MATERIALS

All prices per ton except where otherwise stated.

## Pig Iron

### Foundry and Forge

**No. 3, Class 2**

| | |
|---|---|
| Middlesbrough (10 tons or over) | £21 17 0 |
| Birmingham (10 tons or over) | £21 9 3 |

### Phos. Over 0·1 up to 0·4%

| | |
|---|---|
| Birmingham (6 ton lots) | £23 5 0 |
| Grangemouth (6 ton lots) | £23 10 0 |

### Hæmatite

**English No. 1** (10 tons or over)

| | |
|---|---|
| N.E. Coast (made in N.E.) | £23 19 0 |
| Scotland | £24 5 6 |
| Sheffield | £25 9 0 |
| Birmingham | £25 13 0 |
| **Welsh** 10 tons or over | £23 19 0 |

## Steel Products

| | |
|---|---|
| Medium plates (50 tons andover) | £43 16 6 |
| Mild steel plates, ordinary (50 tons and over) | £40 7 0 |
| Boiler plates (50 tons and over) | £42 17 0 |
| Flat bars, 5 in. wide and under (50 tons or over) | £39 1 0 |
| Round bars, under 3 in. (50 tons or over) | £39 1 0 |
| Billets, rolling quality, soft U.T. (100 tons or over) | £31 15 6 |

## Phosphor Bronze

| | |
|---|---|
| Ingots (288) (A.I.D. d/d | £311 0 0 |

## Copper

| | |
|---|---|
| Cash (mean) | £226 7 6 |
| Cold rolled and hot rolled sheets 4 ft. by 2 ft. by 10 SWG | £303 15 0—304 0 0 |
| Rods, $\frac{7}{16}$ in. to $\frac{1}{2}$ in. diam. | £318 10 0 |
| Tubes, $1\frac{1}{4}$ in. bore by 10 SWG, ton lots, per lb. | 3s. 1½d. |
| Wire rod, black, hot-rolled ($\frac{1}{4}$–$\frac{7}{16}$ in.), English | £241 17 6 |

## Zinc

| | |
|---|---|
| Refined, minimum 98 per cent purity, current month (mean) | £84 15 3 |

## Brass

| | |
|---|---|
| Tubes, solid drawn, per lb. | 1s. 10d. |
| Strip 63/37, 6in. by 10 SWG coils, ton lots | £258 0 0—£261 0 0 |
| Rods, $\frac{1}{2}$–3 in. diam. (59 per cent copper) | 2s. 0½d. |

## Yellow Metal

| | |
|---|---|
| Condenser plates, per ton | £188 0 0 |
| Rods, per lb. | 2s. 1½d. |

## Aluminium

| | |
|---|---|
| Ingots, min. 99·5 per cent Canadian d/d | £186 0 0 |

## Tinplates

| | |
|---|---|
| *U.K. Home trade: Cold reduced, f.o.r. makers works (15-50 tons) | £3 6 8 |
| U.K. Export: Hot rolled basis, f.o.r. works port | 73s. 6d.—76s. 0d. |
| Cold reduced basis, f.o.r. works port | 73s. 6d.—76s. 0d. |

## Gunmetal

| | |
|---|---|
| Ingots, B.S. 1400 L.G.2, delivered | £221 0 0 |

* Official maximum price, after allowing for adjustments for increase in price of tin.

## MAKERS' PRICES

### Hexagon Steel Bars[1]

| | |
|---|---|
| Sizes in inches from 1 in. up to 2·21 and 2·41 a/f ex works, 2 ton basis | £42 17 0 |
| Free cutting black | £47 6 6 |

### Reeled Steel Bars[1]

| | |
|---|---|
| Single-reeled, 1½ in. upwards, f.o.t. works (+ usual extra for sizes) | £43 9 6 |
| Free cutting | £47 19 0 |

### Precision-ground Mild Steel[2]

| | |
|---|---|
| 1-in. diam. + 0·00025-in. 4-ton lots, per cwt. | 121s. 6d. |

### Bright Ground Stainless Steel Bars[3]

| | |
|---|---|
| EN56AM (martensitic, free cutting) | £304 10 0 |
| EN58AM (austenitic free cutting) | £377 10 0 |

Prices are basic, subject to extras

### High-speed Steel

Black random length bar. All prices basic, per lb., subject to extras:

| | |
|---|---|
| Molybdenum "66" | 6s. 5d. |
| Molybdenum "46" | 6s. 3d. |
| 14 per cent tungsten | 6s. 11d. |
| 16 per cent tungsten | 7s. 4d. |
| 18 per cent tungsten | 7s. 9d. |
| 22 per cent tungsten | 9s. 2d. |
| 5 per cent cobalt | 10s. 10d. |
| 4·75/5·25 molybdenum + 6·0/6·75 tungsten + 1·75/2·05 vanadium per cent (5-6-2) | 6s. 7d. |

### Precision-ground, High-speed Free-turning Brass Rod[3]

| | |
|---|---|
| ½-in. diam. ±0·00025-in., 2 ton lots, per lb. | 2s. 9½d. |

### Grey Iron Rod

**Die Cast**[4] in random lengths 18 in. to 26 in. rough machined ⅛-in. above listed size. Extra for definite lengths. Discounts for orders over £150.

| | Per cwt. net. Mark I | Mark III |
|---|---|---|
| ⅜ or ½ in. | 260s. 3d. | 338s. 3d. |
| 1 or 1½ in. | 208s. 4d. | 267s. 3d. |
| 1½ to 1¾ in. | 146s. 3d. | 181s. 7d. |
| 1⅞ to 2 in. | 112s. 7d. | 133s. 6d. |
| 2¼ to 3½ in. | 97s. 1d. | 112s. 9d. |
| 3⅝ to 12 in. | 91s. 9d. | 105s. 3d. |

### Continuous Cast

10-ft. lengths, centreless machined 1 to 3-in. diam. + 0·010 to 0·020 in., prices as quoted for die cast bar[4]

| | | |
|---|---|---|
| centreless ground 1 or 1½ in. + 0·010 in. Extra | 202s. | 3d.† |
| for hardenable alloy iron[5] | 1½ to 1¾ in. | 142s. 0d.† |
| | 1⅞in. to 2 in. | 109s. 4d.† |
| Per cwt. net | 2¼ to 3½ in. | 94s. 3d.† |

† All prices+3 per cent.

### Stellite[6]

### Welding Rods, plain

| | |
|---|---|
| ¼ in. diam., per lb. | 30s. 0d. |

### Toolbits

| | |
|---|---|
| ¼ in. sq. × 4 in., each | 22s. 3d. |

1 Colvilles, Ltd., Glasgow, and 17 Grosvenor Street, London, W.1. 2 Pratt, Levick & Co., Ltd., Chester. 3 Spartan Steel & Alloys, Ltd., St. Stephens Street, Birmingham, 6. 4 Sheepbridge Alloy Castings, Ltd., Sutton-in-Ashfield. 5 "Flocast." Harold Andrews Sheepbridge, Ltd., Halesowen. 6 Deloro Stellite, Ltd., Highlands Road, Shirley, Solihull.

## BASIC PRICES FROM LONDON STOCK[8]

### Free Cutting Steel

| | |
|---|---|
| Bright cold drawn: (Usaspead) over 1 to 2 in. | £59 4 6 |
| Lead bearing (Usaled) | £63 11 0 |
| Precision ground, 1⅞ in. | £84 14 6 |

### Bright Drawn

| | |
|---|---|
| M.S. bars (M.M.C.) over 1¼ to 2 in. | £56 10 0 |
| Square edge flats (Usaflat) | £73 6 6 |
| M.S. angles (Usaspead) | £100 6 6 |
| Case hardening (EN) (Usacase) over 1¼ to 2 in. | £62 10 0 |
| M.S. bars (EN3B) (Usamild) over 1¼ to 2 in. | £58 16 6 |
| Carbon manganese semi-free cutting case hardening (EN202) (Usaspead 202) over 1¼ to 2 in. | £71 5 0 |
| 35/45 ton tensile (EN6) (Usen) over 1 to 1¼ in. | £67 3 0 |
| 0·4 carbon normalized (Usaspead "40") over 1¼ to 2 in. | £69 5 0 |
| 0·45 carbon normalized EN9 (Usaspead 55) | £69 15 0 |
| Carbon manganese steel to Specification EN16T (Usaspead 5565), per ton | £126 17 0 |

### Ground Flat Stock

18-, 24-, and 36-in. lengths (Usaspead). List prices plus 10 per cent, less 5 per cent.

### Oil Hardening Cast Steel

| | |
|---|---|
| Non-shrink (Usaspead N.S.O.H.) ¾ in. to 2½ in., per lb. | 1s. 11d. |
| Non-distorting heavy duty (Usaspead H.C.H.C.), ¾ in. to 2½ in., per lb. | 4s. 2d. |

### Silver Steel

| | |
|---|---|
| (0·194-in. to 1¼-in.) Genuine Stubs quality, per lb. | 4s. 10d. less 27½% |
| M.M.C. quality, per lb. | 2s. 8d. + 6¼% |
| Boxes of 16 assorted sizes, $\frac{1}{16}$ in. to ½ in. diam. | 7s. 6d. |

### Stainless Steel

| | |
|---|---|
| KE40AM (free cutting), per lb. | 3s. 8d. |

### Glacier Machined Bronze Bars

| | |
|---|---|
| Phosphor bronze (288) / Lead bronze | Prices on application |

### High-speed Steel

18 per cent tungsten. Prices on application. Toolholder bits:

| | |
|---|---|
| Usaspead "Super" / "Supreme" / Cobalt 10 | List price |

### Shimstock

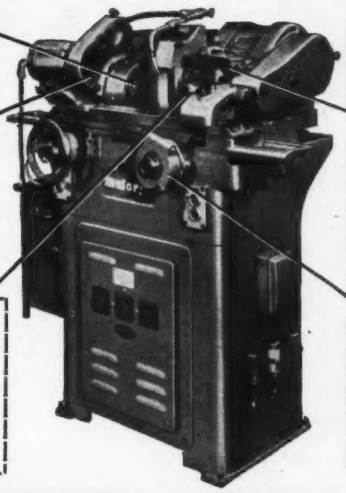
| | |
|---|---|
| Steel assorted, per tin | 3s. 6d. |
| Brass " " | 7s. 3d. |

8 Macready's Metal Co., Ltd., Pentonville Road, N.1. Subject to confirmation by London Office. Delivered free by van in London area.

Extra work holding collets, up to ½in. diameter capacity, fit directly into spindle bore. Optional Extras: 3-jaw 3½ inches diameter precision self-centring, and 4-jaw independent chucks.

Extra equipment is "live" spindle swivelling workhead which plugs in. Features include: rapid changeover from standard, large spindle flange, reversing switch for face grinding, 12 spindle speeds 65 to 670 r.p.m.

**Myford MG12 GRINDING MACHINE**



Circulating pump and ample oil reservoir ensures constant lubrication of 'Myford' cartridge - type wheel spindle unit. Spindle is of nitralloy steel. Easily replaced.

Electrically regulated work speed for "dead or alive" workspindle, with two ranges of six speeds. Range selected by V-belt transfer, speed by selector switch.

Optional Extra: removable internal attachment for mounting on wheelhead front. Grinding diameter 0.25 to 3 in. (6.5 to 75mm) depths to 3 in. (75mm).

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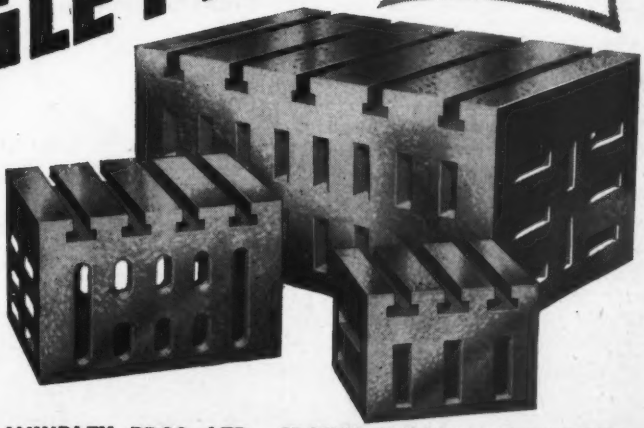

These box angle plates are grade "A" with a guaranteed accuracy of 0·0002in. per foot, flat and square. They are manufactured in high duty cast iron with cored slots and machined "T" slots.

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9in. by 7in. by 6in.
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18in. by 12in. by 9in.

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***in various sizes for VERY FAST INDEXING***

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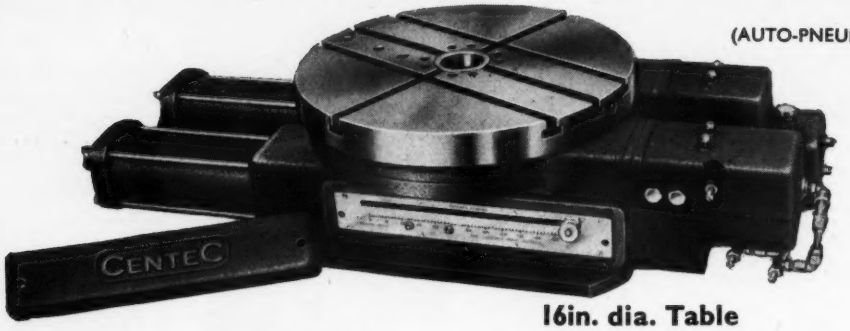


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- Self-locking after indexing
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**R510** $\frac{3}{8}$in. dia. by 2$\frac{3}{4}$in. length.

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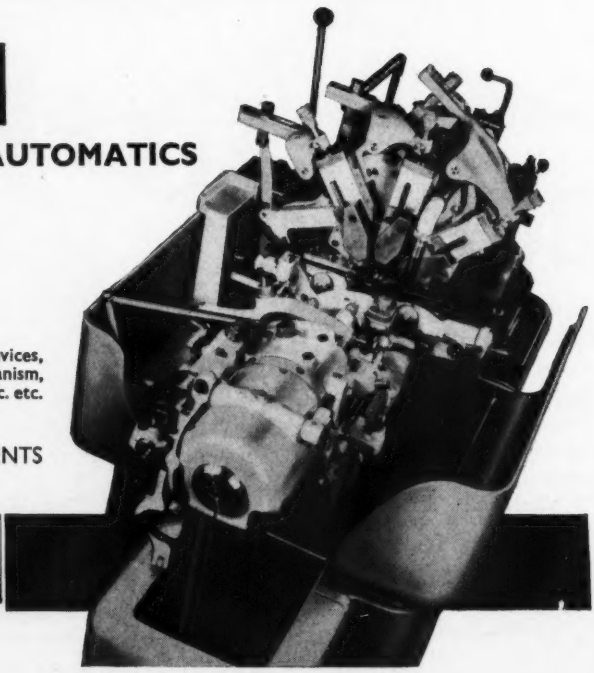

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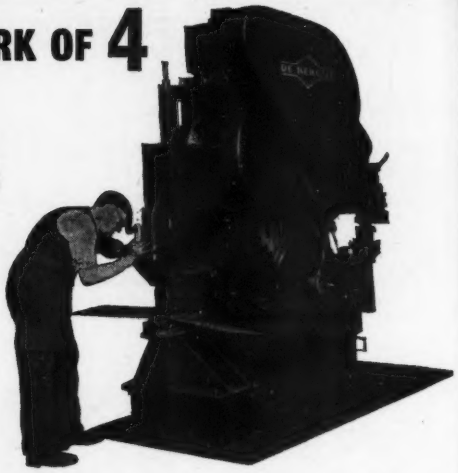

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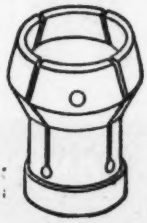

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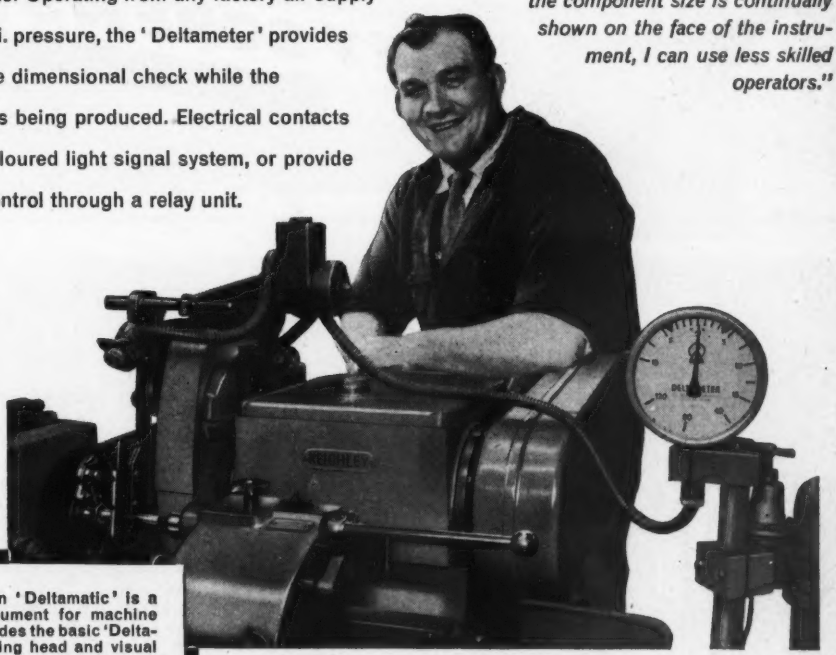

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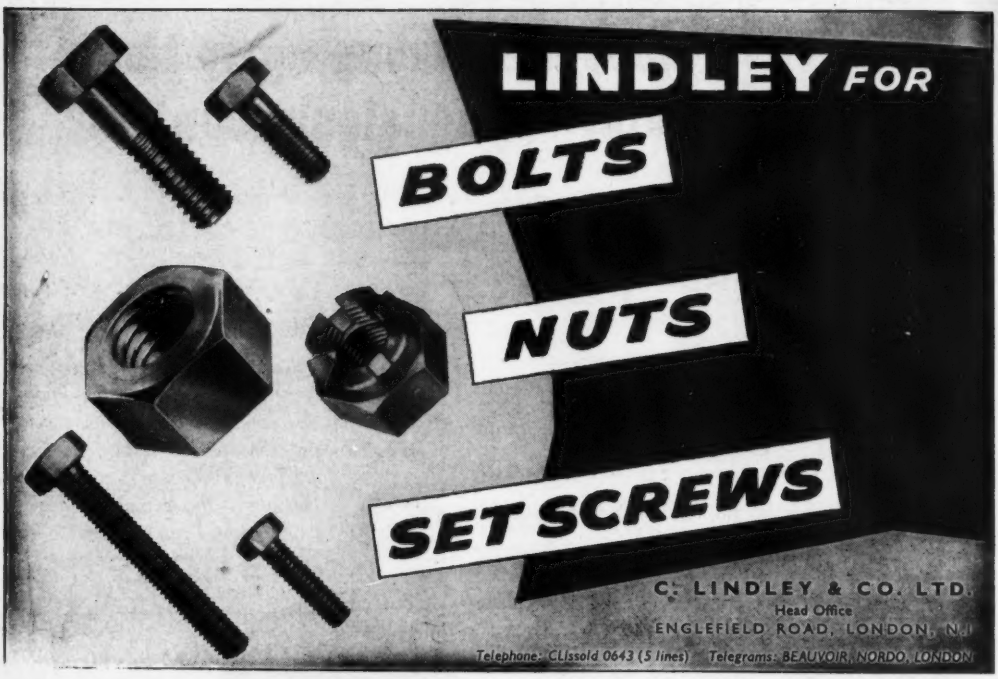


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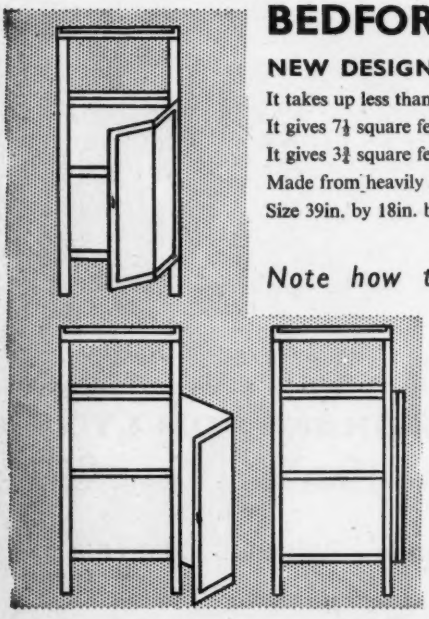

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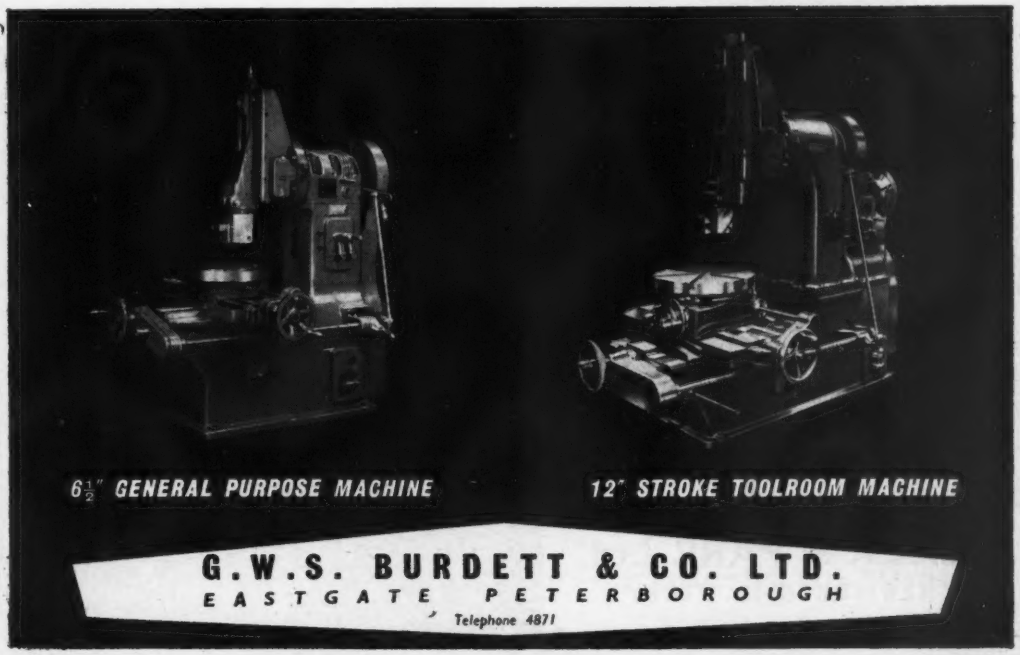

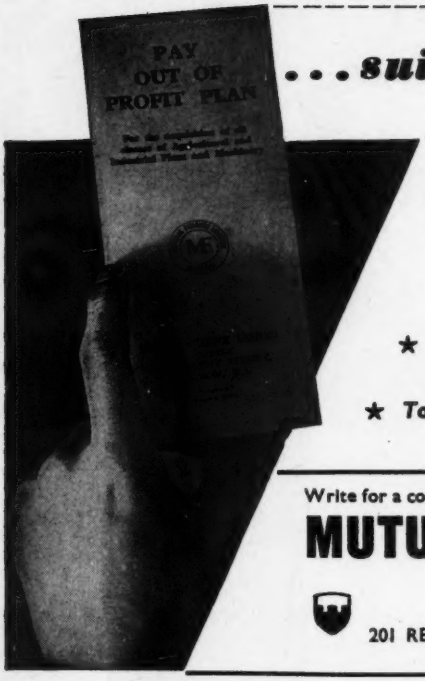


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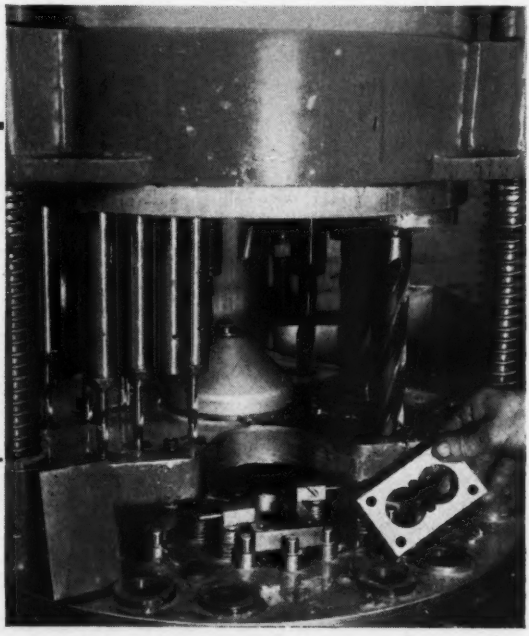

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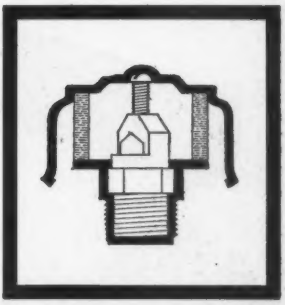

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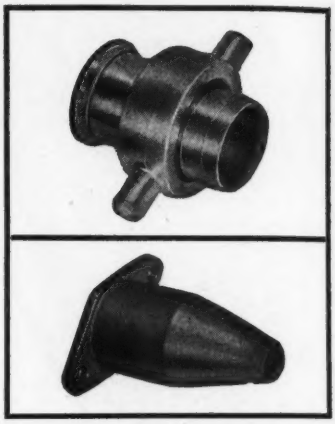

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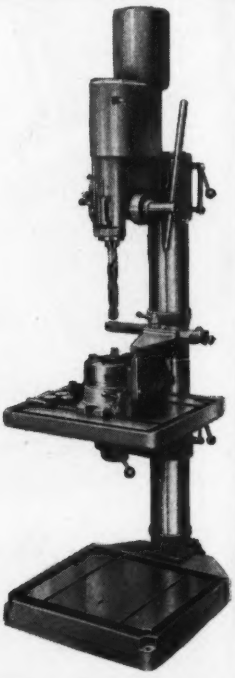

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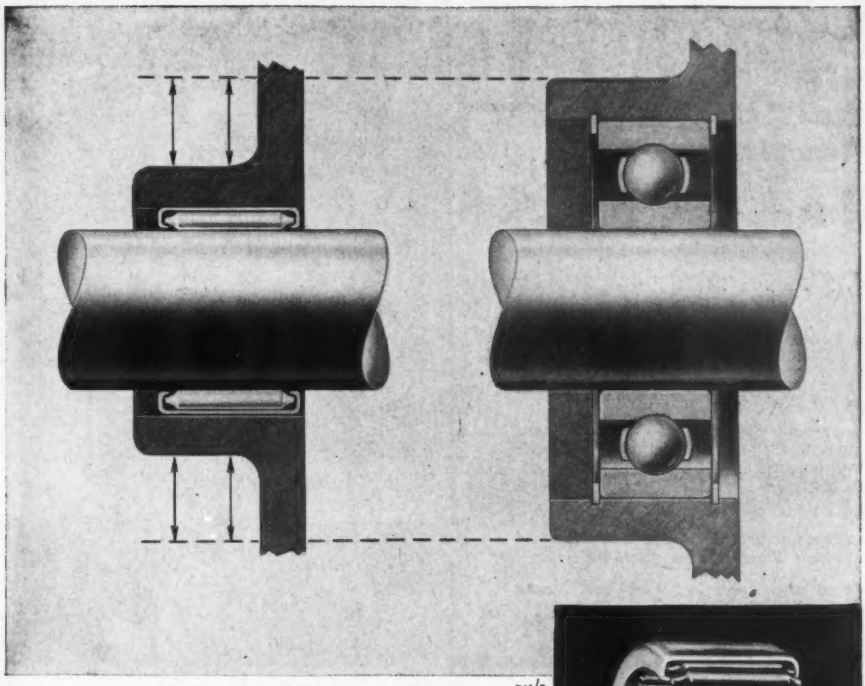

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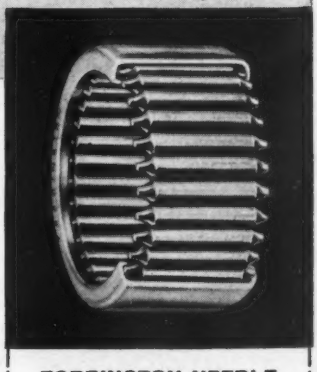

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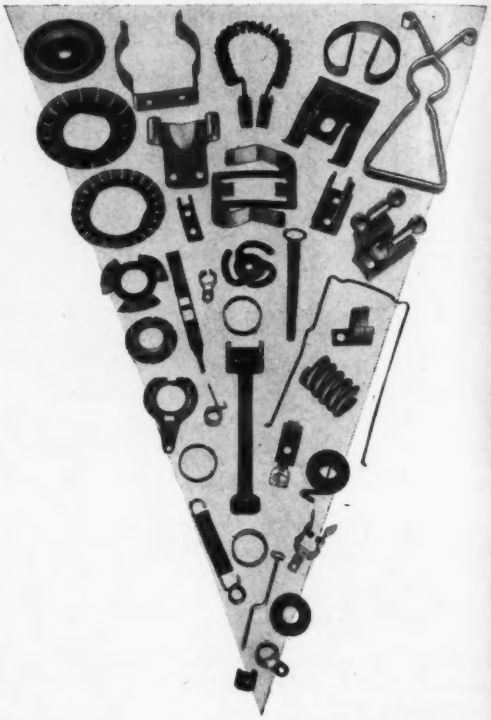

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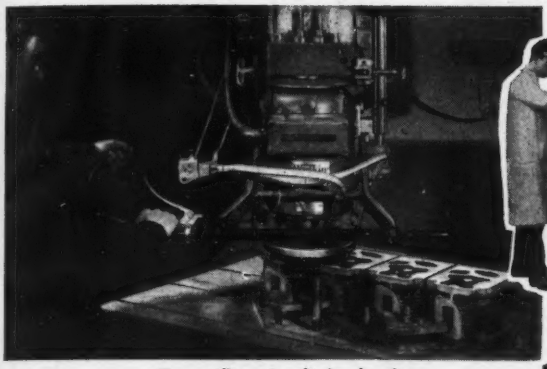
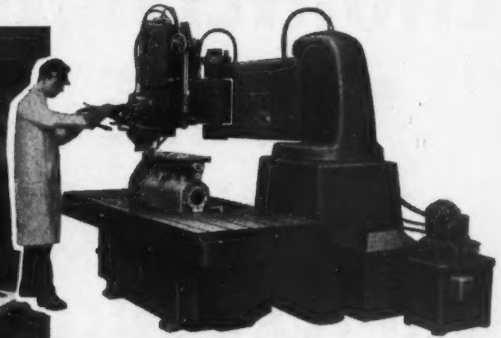
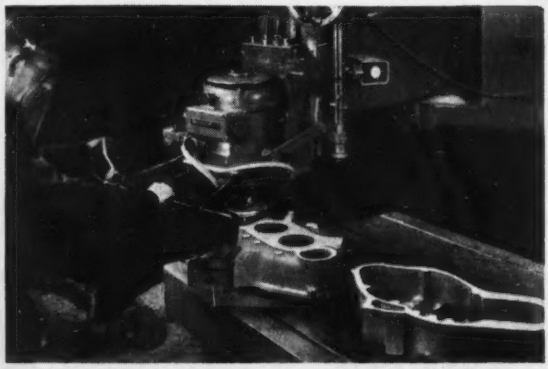


Face-milling 4 cylinder heads



*Wadkin Articulated Arm Router, L.C.*



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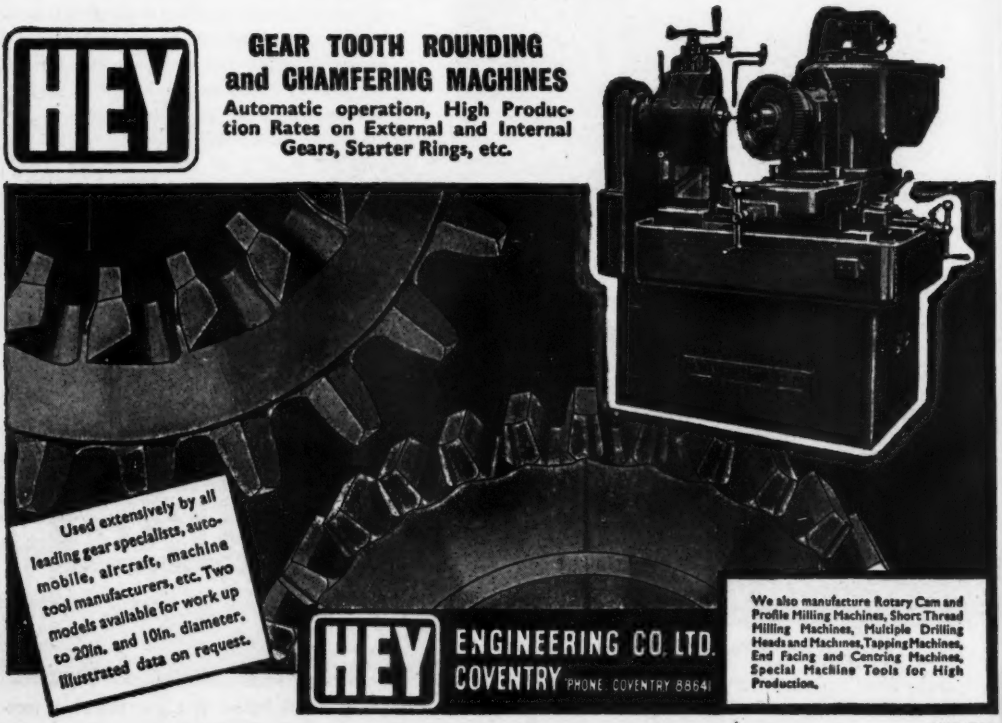

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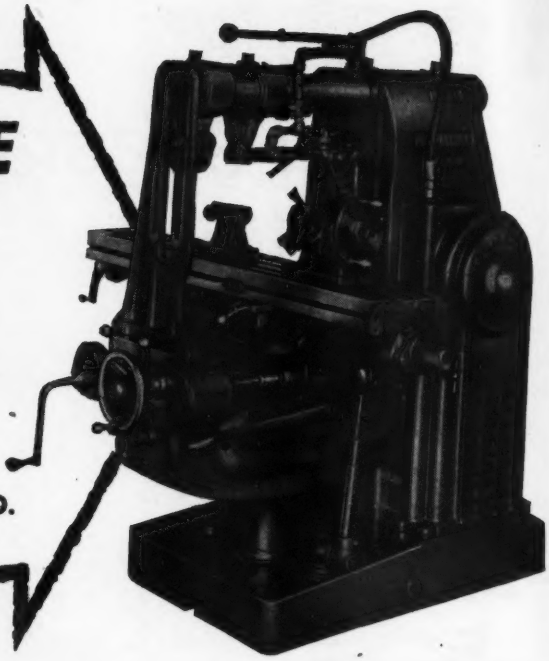

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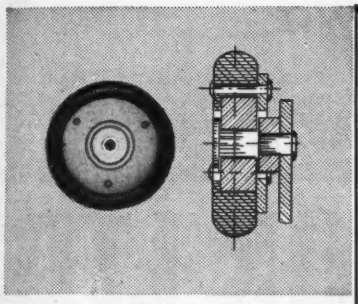
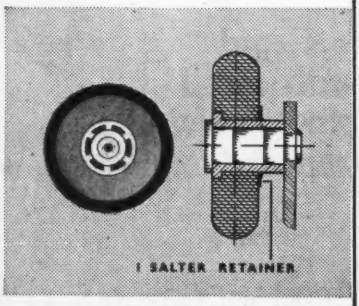
**Salter retainers simplify design of overhead door wheel with great savings**



**THE OLD WAY** Overhead door wheel flushing held in wheel by three rivets. Difficult to position rivet holes and many rejects. Rivets would work loose in use.

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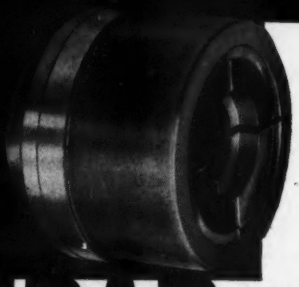
M-W. 483

# The Dunbar & Cook Collet Chuck



Designed for use with "Ward" 2A, 3A, or "Herbert" 2D and 4 Senior Capstans and Air Operated Lathes, this oversize collet chuck enables second operation work up to four inches diameter to be accommodated but retains all the benefits of a ball chuck. Can now be supplied as an Air Chuck to suit any lathe.

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**B.S.A. ACME-GRIDLEY** ⅝in. Six, 1⅛in. Six, 2¼in. Four-Spindle Autos.
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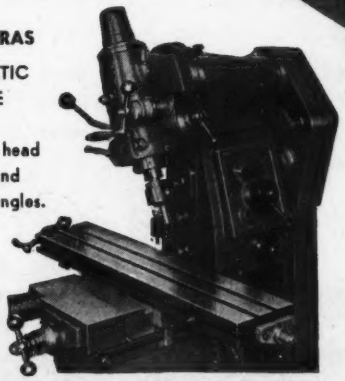

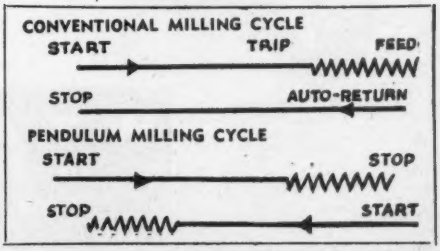


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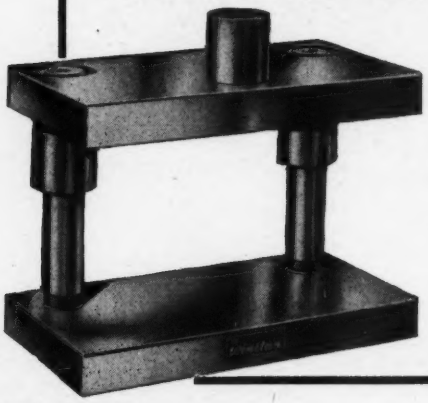

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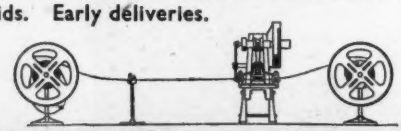

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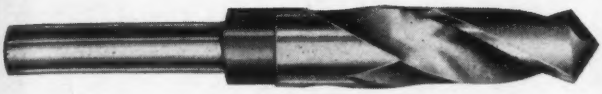

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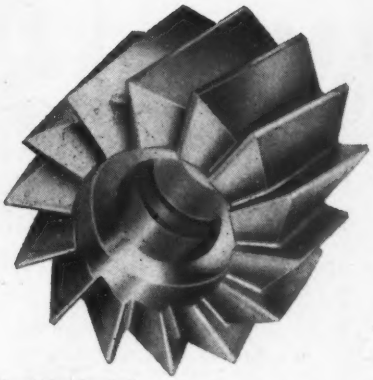
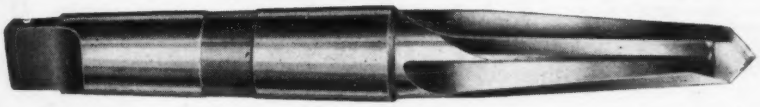


Jobbers drills • taper shank drills reamers • milling cutters • end mills side and face cutters • angle cutters



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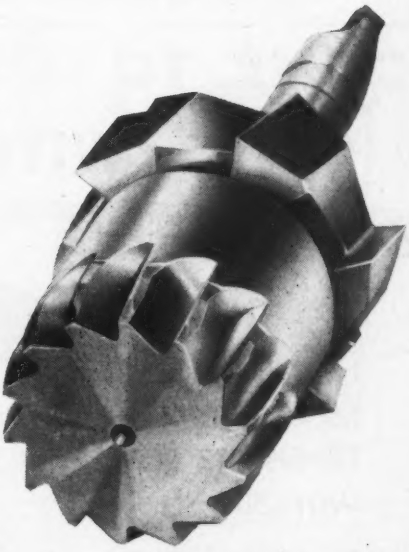

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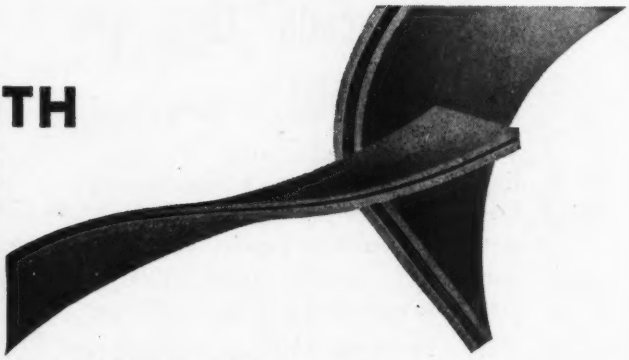

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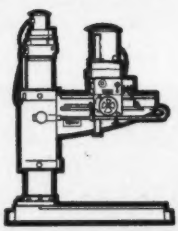
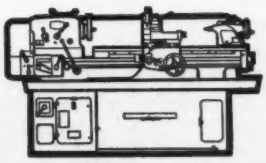
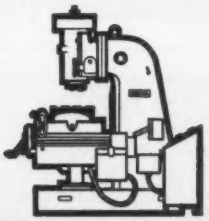
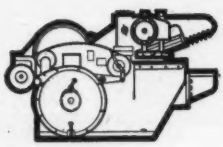
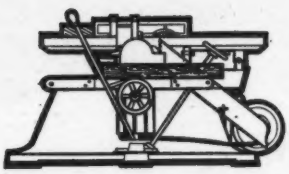
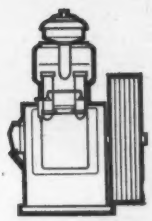

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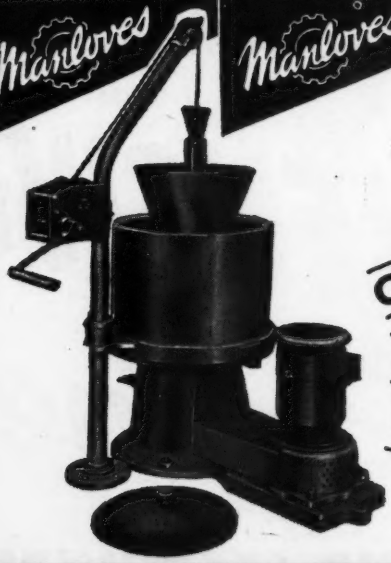

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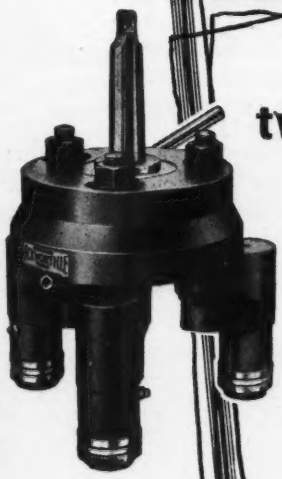

Fig. 199

### two of our standard range

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Fig. 203

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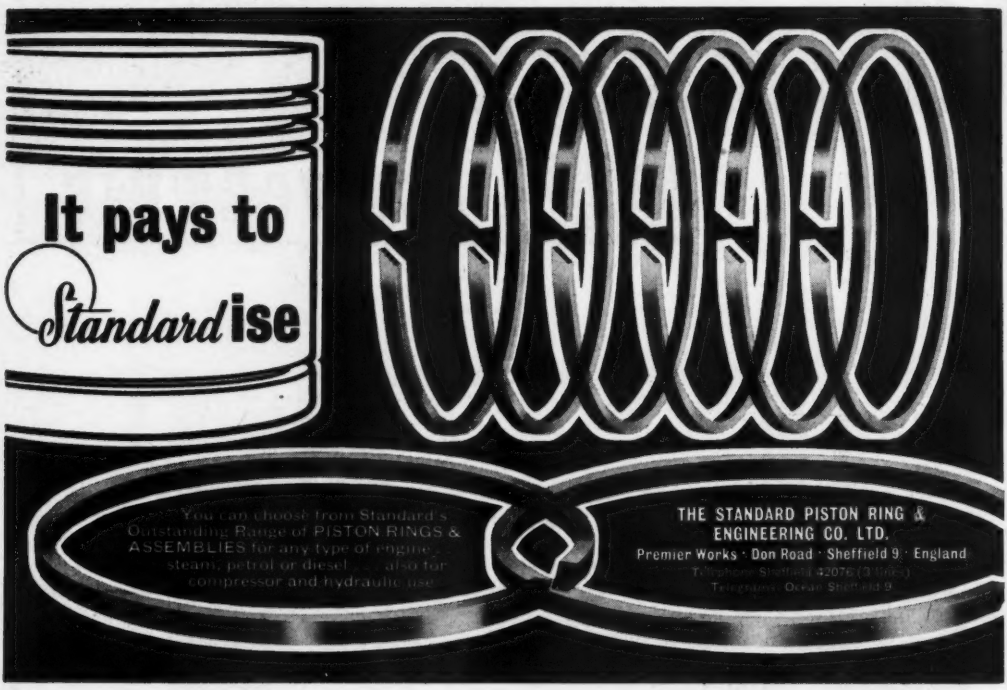
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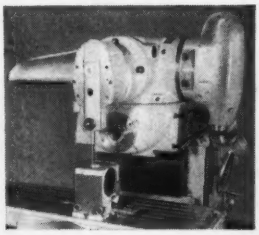

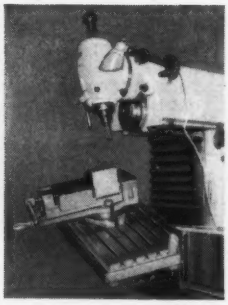

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Vertical milling head, slotting attachment, high speed vertical milling head, rotary table, fixed swivelling and tilting, and swivelling tilting and inclinable tables, punch milling attachment, dividing head and spiral milling attachment, and on the larger models power fed vertical milling attachment will be available. It is also possible on the MAHO model MH.800 to fit this machine with hydraulic copying equipment, and on the model MH.1000 HEID electronic copying equipment is available.

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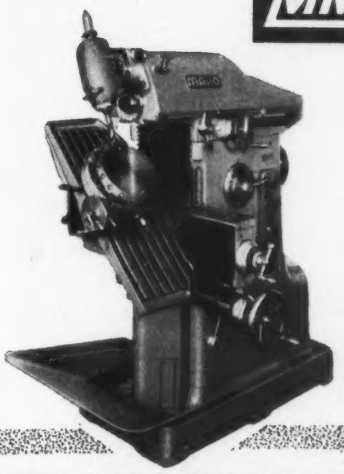

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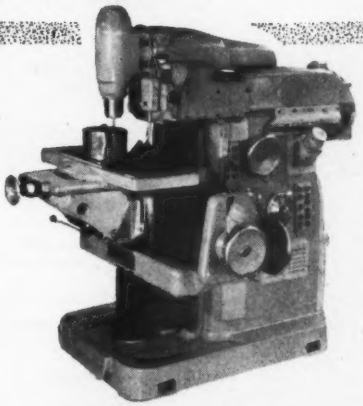
**MAHO MH.800.** Table 31½" x 12½", horizontal spindle speed 32 - 1320 r.p.m., vertical spindle speed 45 - 1900 r.p.m.

**MAHO MH.1000.** Table 47¼" x 14½", horizontal spindle speed 40 - 2000 r.p.m., vertical spindle speed 40 - 2000 r.p.m.

Models MH.800 and MH.1000 are equipped with independent spindle drive motors mounted on ram.



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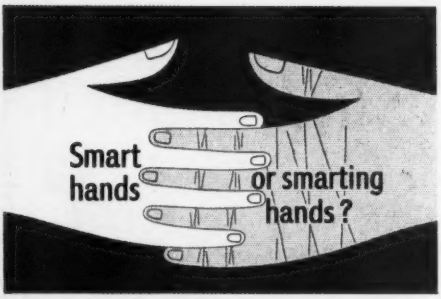


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**AFTER WORK** new Rozalex Industrial Skin Cleanser removes dirt and contaminants quickly and safely, leaving hands thoroughly clean and supple. *Other specialised Rozalex products include Stain Removing Cream, Resin Removing Cream and Waterless Skin Cleanser.*

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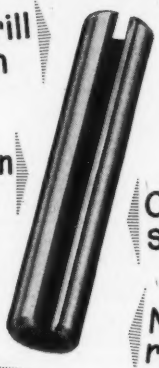
Constantly secure

No reamering



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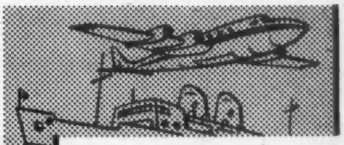
Manufacturers for over 20 years. (Est. 1870)

# RID -O- RUST



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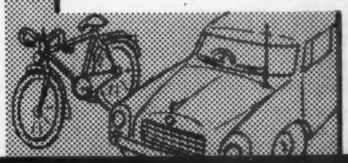

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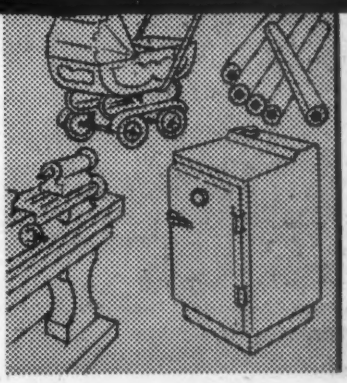

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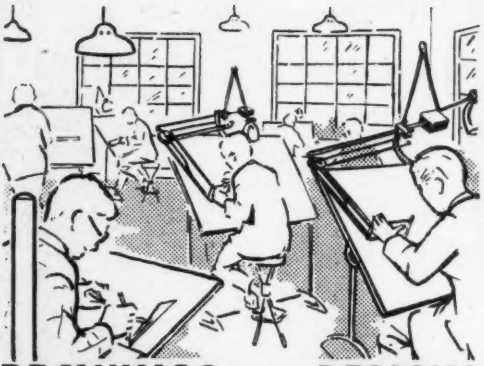

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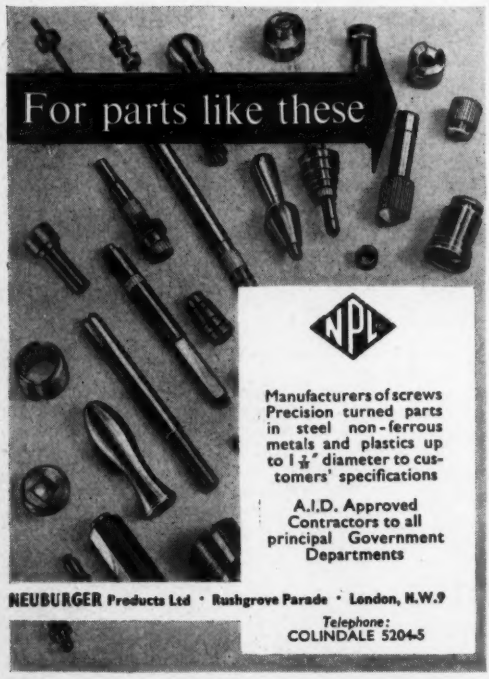


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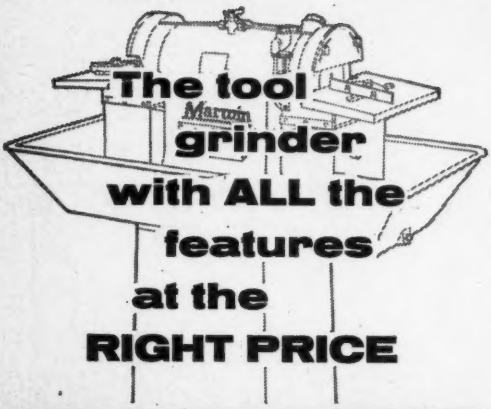

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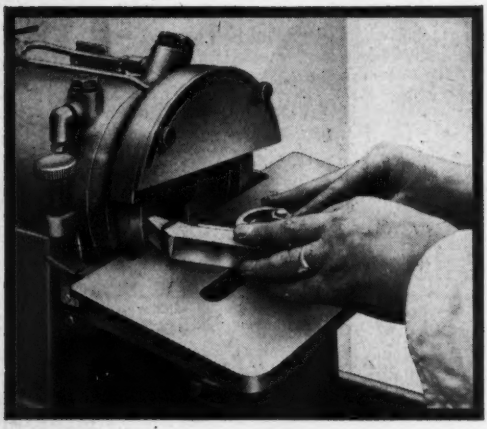

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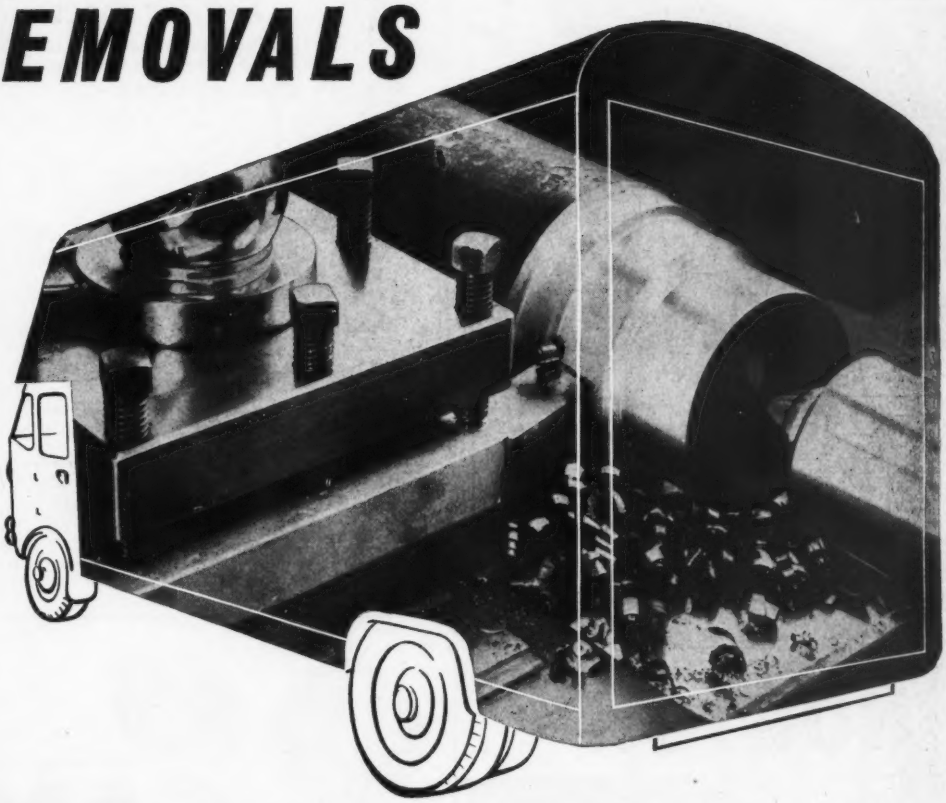

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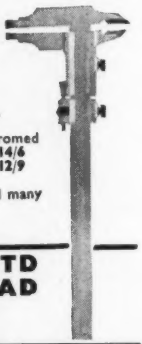

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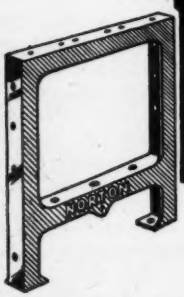

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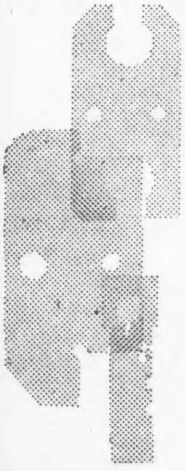

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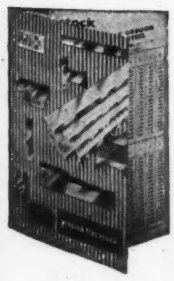

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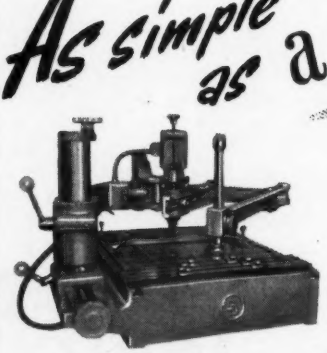

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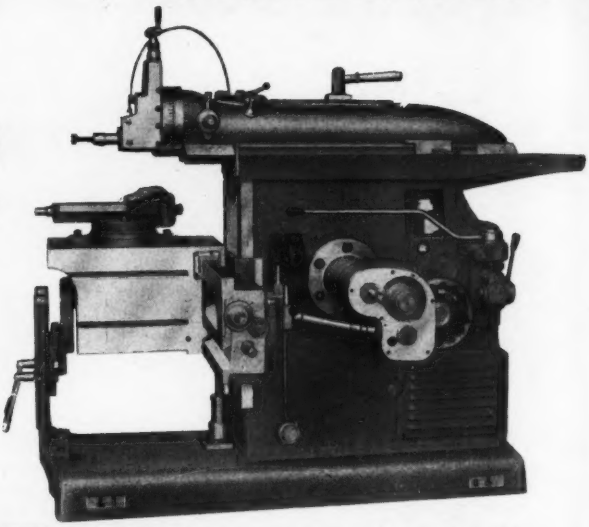

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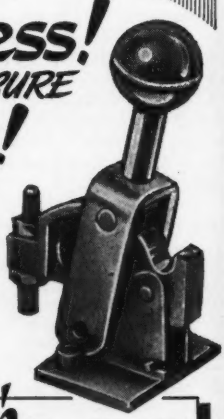

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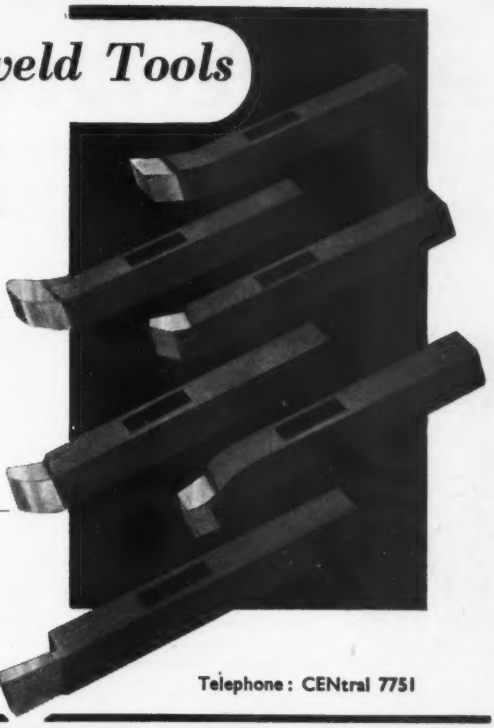

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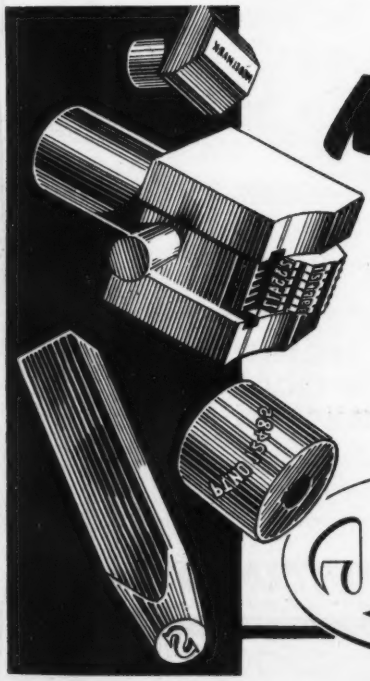

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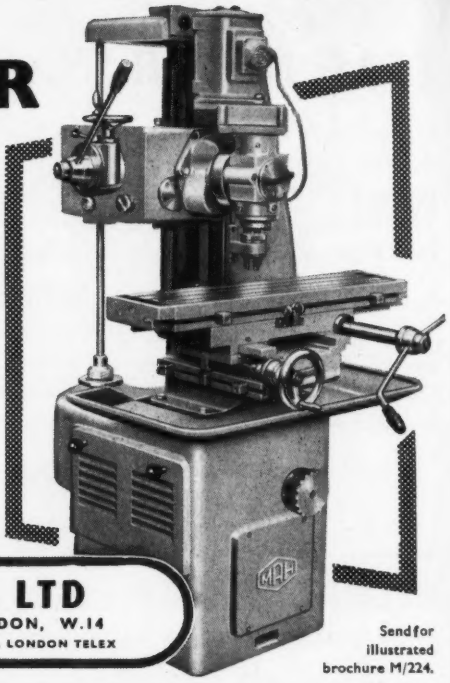

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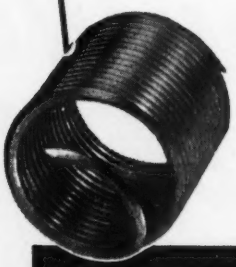

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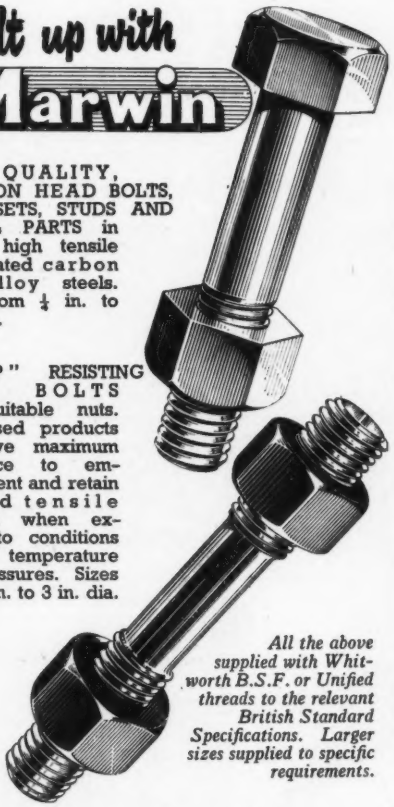

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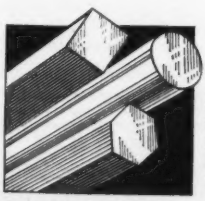

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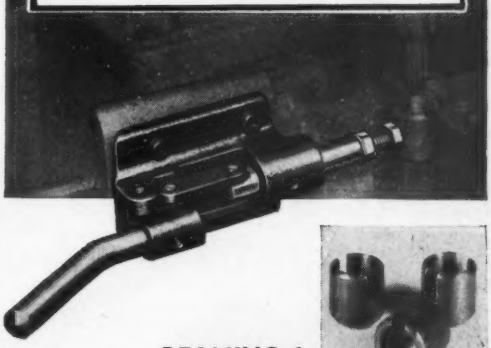

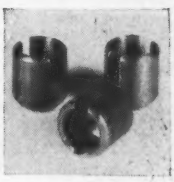

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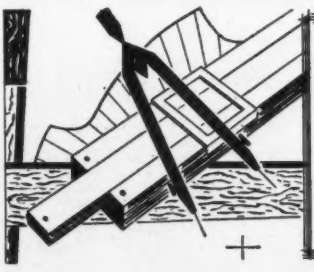

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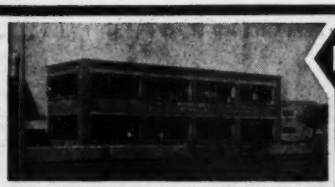

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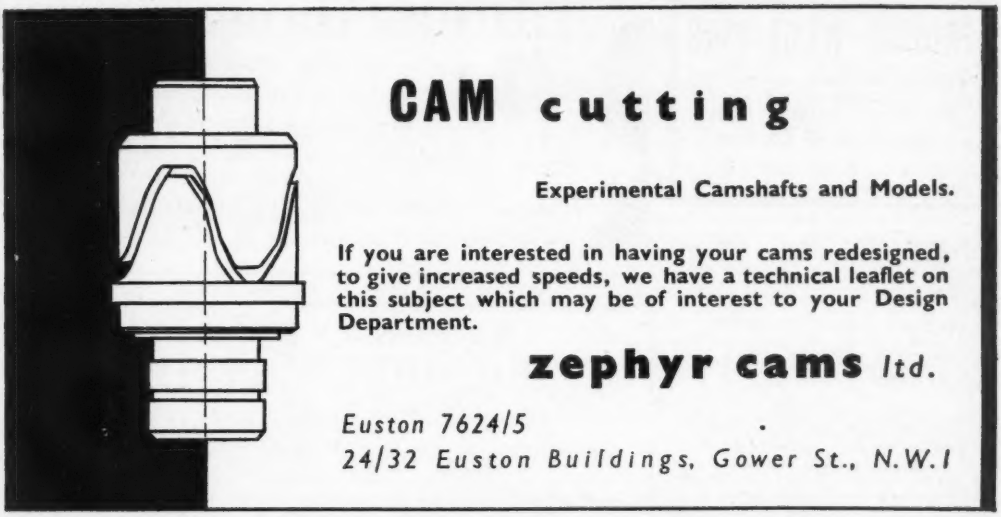
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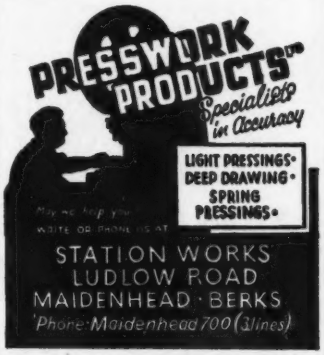
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27in. **WOTAN** Hydraulic Shaper.
16in. **BLANCHARD** Rotary Surface Grinder.
New **PASQUINO** Vertical Mill. Swivel head, power feeds and rapids.
New 35½in. **ZERBST** Lathe, 10ft. 4in. between centres.
New 10in. × 40in. **MIKROMAT** Hydraulic Surface Grinder.
24in. × 36in. **BULLARD** Vertical Borers.
No. 2 **WARNER & SWASEY** Chucking Capstan.
24in. × 8in. **ABRASIVE** Model 3B Surface Grinder, with magnetic chuck. As new.
New **LAGUN** 49in. × 12in. Universal Miller, with dividing heads and universal attachment. Power feeds and rapids in all directions. £1,250.

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**Snow Vertical Spindle Surface** Grinding Machine, type NB18, size 72in. × 15in., hydraulic feed to table. Excellent condition.—BOX C736, MACHINERY, Clifton House, Euston Road, N.W.1.

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**B.S.A. 6in. × 20in. Production** Lathe. Damaged machine, ideal for spares. £75 or offer.—BOX C741, MACHINERY, Clifton House, Euston Road, N.W.1.

Classified Advertisements (*PLANT FOR SALE, contd.*)

## F. J. Edwards Ltd

**BORING MACHINES**

**NEW SWEDISH** Precision Horizontal Boring Machines, 3in. and 3½in. travelling spindle, with facing head and screwcutting motion. (Sole British Agents.)

**KEARNS** OB Horizontal Borers, with screwcutting motion, covered bed, spindle 2½in.

**GIDDINGS & LEWIS** No. 0 Horizontal Boring, Milling and Drilling Machine, 3½in. traversing spindle, table 45½in. × 27½in.

**RICHARDS** P.R.T.2N. Horizontal Boring and Facing Machine, 3in. traversing spindle, 1955 machine, extra height and length.

**RICHARDS** HB2 Horizontal Boring, Milling, Drilling and Tapping Machine, 2½in. spindle, screwcutting motion.

**WEBSTER & BENNETT** 36in. Vertical Borer.

**FRORIEP** 54in. Heavy Duty Vertical Turning and Boring Mills, with side head, all rapid traverses, table speeds 3½ to 180 r.p.m., main motor 50 h.p., 1952 machines in excellent condition. Weight 14½ tons.

**CAPSTAN AND TURRET LATHES**

**WARNER & SWASEY** 3A Turret Lathe, 4½in. hollow spindle, 23½in. dia. swing over bed covers.

**HERBERT** No. 12 Combination Turret Lathe, roller bearing spindle, covered vee bed, swing over bed 23½in., hollow spindle 6½in. dia., good equipment, chasing saddle with automatic sliding and surfacing feeds.

**HERBERT** No. 21 Combination Turret Lathe, swing 28in. over the bed, 7½in. hollow spindle, chasing saddle with automatic sliding and surfacing feeds.

**HERBERT** No. 7 Combination Turret Lathes, hollow spindle 2⅜in. dia., 16in. swing, speeds 18-366 r.p.m.

**LIBBY** 4A Capstan Lathe, 2½in. hollow spindle, 20½in. swing, speeds 27-725.

**WARD** No. 7 Combination Turret Lathe, 14½in. swing, 2½in. hollow spindle, speeds 13-520 r.p.m., chasing saddle, ball chuck.

**HERBERT** Model 2S Capstan Lathe, collet capacity 1¼in. dia., 11in. swing, ball chuck and bar feed, speeds 38-2,100.

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**HERBERT** 7ft. Radial Drilling, Tapping and Boring Machine, spindle No. 5 M.T., 20in. dia. column. Weight approx. 8 tons.

**CERUTI** 5ft. 6in. Radial Drilling Machine, spindle No. 5 M.T., speeds 30-1,500 r.p.m. As New.

**TOWN** 5ft. Radial Drilling Machine, spindle No. 5 M.T., speeds 26-580 r.p.m.

**TOWN** 4ft. 6in. Radial Drilling and Tapping Machine, Model AE4, No. 5 M.T. (New.)

**CINCINNATI BICKFORD** 36in. Radial Drilling Machine, spindle No. 4 M.T.

**HEGIC** (Swedish) 27in. Radial Drilling Machine, 1¼in. capacity, speeds 80-890 r.p.m. (New.)

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**ARCHDALE** No. 2240 28in. Production Type Drilling Machines, capacity in mild steel 3in. dia.

**HERBERT** Type C Pedestal Drilling Machine, No. 3 M.T., 230 volts, single phase. Auto spindle feed, flange mounted motor.

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**CONOMATIC** 1¼in. 8 spindle. Type W.W.

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**KEARNS** No. 2 Boring and Facing.

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**ASQUITH** 4ft. 6in. O.D.1 Radial Drill.
**PROGRESS** 5E. Round table.

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**LANDIS** 12 × 48 Universal Grinder.
**CHURCHILL** 8 × 36in. Plain. Hydrauto bearings.

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**EDGWICK** 7in.
**DEAM, SMITH & GRACE.** Height of centres 7in.
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18in. **EDGWICK** Production Mill
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**EDWARDS** 8ft. × ¼in. Overcrank.
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6ft. × 12g. between column. Delivery 10 weeks.
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**ARCHDALE** 36in. Production Drill No. 5 M.T.
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Precimax Cylindrical Grinder, 6 × 24, Model MPL. Hydraulic, motorised 440/3/50, overhauled and in first class condition. Below.

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**NEW UNION** G.14 and G.15 Double Ended Grinders. Wheels 14in. by 2in. M.D. 400/3/50. (Available ex stock.)
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**RICHMOND** No. 01 Plain Horizontal Miller. Table 31in. by 8in. Table working surface 26in. by 8in. Long traverse 16in. hand or power; cross 5½in., vertical 15½in. by hand only. Speeds 34–400 r.p.m. M.D. 400/3/50.

**CINCINNATI** 2/18 Production Miller. Table 36in. by 9in. working surface. Two-way cycle. Speeds 30–1,200 r.p.m. M.D. 400/3/50.
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**CINCINNATI** No. 3 Dial Type Vertical Miller. Table 62½in. by 15in. Power feed to head. Dual control. Speeds 18–450 r.p.m. M.D. 400/3/50.

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**BRADLEY & CRAVEN** Geared Press Brake. Motorised for 400-440/3/50 supply. Max. pressure approx. 65 tons. Forming capacity 10ft. × 12 s.w.g. over die opening of ¾in., or 8ft. × ¼in. over die opening of 1¼in. Depth of gap 7¼in. Fitted with goat's foot top tools and bottom dies. Weight approx. 8½ tons.
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**Kearns Model O.C. Horizontal** Boring Machine, 8in. dia. traversing spindle. 16 spindle speeds 18-725 r.p.m. Revolving table 42in. × 36in. Spindle to steady 7ft. 6in. Verniers. 7½ h.p. 400/3/50 motor.—LEE & HUNT, LTD., Crocus Street, Nottingham. 'Phone 84246.

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**Kearns Horizontal Boring Machine.** Model "O." Table dimensions 36in. × 36in., longitudinal traverse 40in., transverse motion 15in. Spindle bore No. 5 morse taper. Speeds 72 to 620 r.p.m. Three speed motor. Cheap to clear.—BOX C557, MACHINERY, Clifton House, Euston Road, N.W.1.

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**CINCINNATI** Plain Hydromatic Mill 3/36, speeds 27 to 200 r.p.m., power rapid traverse with auto cycle.
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**SUNDERLAND No. 16**
**GEAR PLANER**
For spur and spiral gears, motor drive, fully equipped.

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|---|---|
| Max. dia. | 32in. |
| Max. face width | 6in. |
| Max. D.P. | 3 |
| H.P. motor | 7½ |

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**GISHOLT** IL Combination Turret Lathe.
**WARD** 3A Capstan Lathe.
**WARD** 7 Capstan Lathe.
**CHURCHILL** HCY Internal Grinder.
**CHURCHILL** No. 0 6in. × 18in. Universal Grinder.
**STANLEY** 8½in. × 48in. S.S. & S.C. Lathe.
**CHURCHILL-REDMAN** 13NM × 7ft. 6in. S.S. Lathe.
**ARCHDALE** 18in. Vertical Miller.
**MODERN** Horizontal Miller, 9in. × 40in. (Overhauled.)
**STAMCO** 5ft. × ¼in. deep throat Guillotine.
**RACCINE** 6in. Cap. Hacksaw.
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**IMMEDIATELY AVAILABLE**

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**WORCESTER** 6 Ton Crank Press.
**UNION TOOL & CUTTER** Grinder.
**DENBIGH** No. 6 Fly Presses.

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**KEARNS** Patent No. 2 High Speed Surfacing, Boring and Milling Machine. New 1959.
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**ASQUITH** 6ft. Radial Drill with screw-cutting attachment.

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**BULLARD** 24in. Vertical Boring Machine.

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**KITCHEN & WADE** 3ft. Radial Arm Drilling Machine.
**PEGARD** 4ft. Radial Arm Drilling Machine.
**HILLE** 4ft. Radial Arm Drilling Machine.

**GEAR CUTTING MACHINE**

**DAVID BROWN** MT30 Gear Hobbing Machine (1951).

**CAPSTAN AND TURRET LATHES**

**WARD** 2A Capstan Lathe.
**WARD** 3A Capstan Lathe.
**WARD** 7 Capstan Lathe. Covered Bed.
**WARD** 8 Combination Turret Lathe. Covered Bed.
**WARD** 10/13 Combination Turret Lathe. Covered Bed.

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**SWIFT** S.S. & S.C. 12½in. by 90in. Gap Bed Lathe.
**SWIFT** S.S. & S.C. 27½ by 90in. Gap Bed Lathe.
**OLDFIELD & SCHOFIELD** S.S. & S.C. 15in. by 26ft. Lathe.

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**CINCINNATI** No. 2 DIAL TYPE Horizontal Milling Machine.
**CINCINNATI** No. 3 DIAL TYPE Universal Milling Machine.
**CINCINNATI** No. 3 DIAL TYPE Vertical Milling Machine.
**MILWAUKEE** 4H Vertical Milling Machine.

ALL MACHINES OFFERED IMMEDIATELY EX-WORKS,

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**Jones & Shipman Hydraulic** Precision Universal Grinder, size 12in. × 36in. with standard equipment and internal spindle. Excellent condition.—BOX C622, MACHINERY, Clifton House, Euston Road, N.W.1.

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**Surface Grinder, 24in. × 8in.** Hydraulic Feeds. Built in Diamond Wheel Dresser. Coolant supply and dust extraction fitted. Make: Favretto model RP.6. Condition as new.—ROLLS TOOLS, LTD., No. 1 Factory, Pyrford Road, Pyrford, Woking, Surrey, or ring Byfleet 43252.

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R. D. Gray.

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**KEARNS** Model OA Horizontal Borer.
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**BUTLER** 4ft. Double Column Vertical Borer, motor drive, speeds to 44 r.p.m.

**GRINDERS**

**NOVAMATIC** "A" Internal Grinder.
**LANDIS** Plain Cylindrical Grinder, 6in. × 18in.
**HORSTMAN** Thread Grinder, capacity 5in. dia. × 9in. b.c.

**LATHES, CAPSTANS AND AUTOMATICS**

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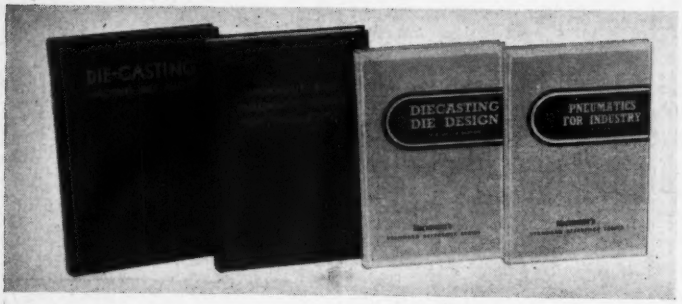


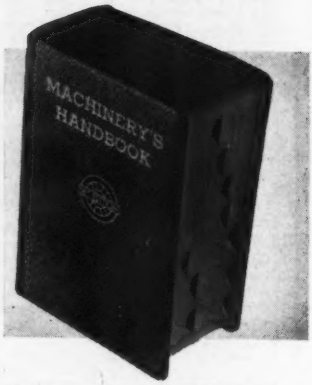


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**FOLDERS**
Sheet Edging, 30in. × 22g.

**GEAR CUTTERS**
SAFAG Pinion.
MAXICUT 7in. × 2in. × 6 D.P.
PETERMAN No. 1 and 2.

**GRINDERS (Surface)**
JONES & SHIPMAN 540 Hyd.
CAPCO Cam.
SUPERIOR.
HEALD 25in. Ring.
CHURCHILL OSB 8in. × 30in.
EXCEL No. 2, 14 × 6 hand.
LUMSDEN Vert. 210 XXM.
SNOW Table, 20in.
ABRASIVE No. 34 Vertical Spindle.
ABRASIVE 3B, 24in. × 8in.
ABRASIVE No. 1½in. hand.

**GRINDERS (Internal)**
BRYANT 16/38.

**GRINDERS (Cylindrical)**
NEWALL 10 × 24 hyd. Model L.
CHURCHILL 6 × 36in. B.Y.
CHURCHILL PBH 12 × 36in. Uni.
NEWALL 6 × 18. Model XL.
FRANCIS 6 × 7.
PRECIMAX MPB 10 × 48.

**GRINDERS (Miscellaneous)**
B. & S. No. 13 Universal.
J. & S. Drill, ¼ to ⅝.
STEDALL WUNDERLI Carbide.
TAUCO 10in. Abrasive Cut Off.
ROWLAND 12in. × 2in. Single Wheel.
ABWOOD Carbide.
WICKMAN NIVEN Carbide.
WADKIN Saw Sharpener.
TURNER T. & C.
JACKMAN D/E 18in. Disc.
EXCEL Model OS, T. & C.
TURNER 14/20 20in. × 3½in. wheels C/E.
MATRIX No. 10 8in. × 20in. Plain Thread.
NEWALL 420 Univ. Thread for taps.
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**KEYSEATERS**
BENTLEY 5in.
ASQUITH H.K.O. Horiz. Duplex.
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LE BLOND Regal S.S. & S.C.
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SOUTHBEND 10in. Toolroom.
WILLSON 7½in. S.S. & S.C.
COLCHESTER TRIUMPH 7in. S.S. & S.C.
SWIFT 12 SV5 facing and boring.
PRATT & WHITNEY 12in. × 30in. S.S.&S.C.
MONARCH 10EE × 22in. S.S. & S.C.
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LORCH A11 Precision.
DENHAM 5in. S.S. & S.C.
RIVETT 3½in. Plain. Model 715.
WARD, HAGGAS & SMITH 8½in. × 78in.
COULTHURST Surfacing and Boring.
RYDERMATIC No. 12 Multi Tool.

**MAGNETIC CHUCK**
HUMPHREYS 54in. × 10in.

**MARKING MACHINE**
FUNDITOR " Sand Jet."

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CINCINNATI 1/18 Production.
DENBIGH Type C4.
ROSCHER EICHLER. Table 39in. × 12in.
SUNDSTRAND No. 0 Production.
ST. ANDREA Model UFO3.
ADCOCK & SHIPLEY Model OCD.
KENT OWEN 1/8 and 1/14 Production.
HARDINGE Precision.
WERNER. Table 14 × 5.
JONES 225 Univ. Table 22 × 6.
ARCHDALE 28in. and 20in.

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REED PRENTICE No. 5, 68in. × 16in. table.
MILNE. Table 30in. × 8in.
WADKIN Type LXIA. Table 36in. × 13in.

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STANELCO Toggle.
APEX Treadle.
NORTON No. 4.

**PRESSES (Power)**
LECRA No. 8. 4 tons.
GERMAN Rotary Punch.
WRIGHT Clicking Press.
SCHULER VZZ, 15 tons d/s gripper feed.

**PROFILING MACHINE**
CURDNUBE 2 Spindle. Model KIV.

**RIVETERS**
HIGH SPEED Hammer, 7/16 cap.
TURNER RH18 (⅛in.), RH38 (⅜in.) RH34 (¾in.), RH14/12 (½in.), RS6 (½in.).

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ATLAS No. 2, 3in.-6in. (Unused.)

**SHAPERS**
INVICTA 24in.
NEWEY 14in.

**SLOTTERS**
EDGWICK.
BENTLEY 4in.

**TAPPERS**
ESSEX No. 24, ½in. cap.
THIEL No. 4, ½-9/32nds.
ACE Horiz., ½in. capacity.
HASKINS Type 3 C.A.M., ½in. cap.
J. & S. Electrotap, ½in.

**THREAD MILLERS**
JONES FB1, 4ft. between centres.

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**Herbert No. 4BS Capstan Lathe.** Full Turret Equipment, etc.

Further details from:—
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**SEDGWICKS** type C.10 Q.L. 10ft. × ⅛in. Universal Bending and Folding Machine. Motorised 415 volts, 3 phase, 50 cycles, with control gear.
**EDWARDS** 4ft. × 14g. Power Guillotine, 415 volts, 3 phase, 50 cycles.

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**4/6, Minerva Road, Park Royal, London, N.W.10**

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**Loewe Boring and Facing Lathe,** high speed machine, 475 to 3,000 r.p.m. Swing 16in. Multi-speed motor, 400/3/50.—BOX C606, MACHINERY, Clifton House, Euston Road, N.W.1.

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**GRANOR OF HALIFAX** 28in. stroke Heavy Duty Shaping Machine. 400-440/3/50.

**EARLY DELIVERY**

**MITCHELL OF KEIGHLEY** 8½in. Type DM8 Gap Bed Lathe, by 5ft. 3in. B.C. 400-440/3/50. Instant delivery.
**MITCHELL OF KEIGHLEY** 10½in. Type DM10 Gap Bed Lathe by 5ft. 5in. between centres. 400-440/3/50. Instant delivery.
**MITCHELL OF KEIGHLEY** 12½in. Type DM12 Gap Bed Lathe by 6ft. 9in. B.C. 400-440/3/50. April delivery.
**VICTORIA** No. 2 Rapidmil Universal Milling Machine, table size 48in. × 11½in. 400-440/3/50. Instant delivery.
**VICTORIA** No. V2 Vertical Milling Machine. Table size 45in. × 11in. 400-440/3/50. Instant delivery.

**CENTAUR TOOL WORKS,**
**EYRE STREET, SPRING HILL, BIRMINGHAM, 18**

Tel.: EDGbaston 1118 & 1119. 'Grams: Capstan, Birmingham

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**Worthington Simpson 2-stage** Air Compressor. Air cooled, size 100, Brooks Motor 21 h.p. 400-440/3/50. Syn. speed 1,000 r.p.m. and Receiver.—BOX C587, MACHINERY, Clifton House, Euston Road, N.W.1.

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**Drummond Maxicut No. 2 Multi-tool** Lathe, 30in. between centres. Swing 22in., longitudinal saddle movement 18in., fitted with extra slides on front and rear tool-posts. Auto. return to slides. Motorised 45 h.p. 400-440/3/50.—BOX C664, MACHINERY, Clifton House, Euston Road, N.W.1.

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**Reed Prentice No. 6 Large Vertical Milling Machine.** Table 84in. × 20in. 3¼in. tee slots. Table traverse long. 72in. Table traverse trans. 24in. Power feeds and rapid feeds, spindle speeds 15 to 500 r.p.m. Spindle traverse 12in., head traverse 24in. Throat clearance 28in., daylight max. 38in., min. 2in. Seen London area.—BOX C558, MACHINERY, Clifton House, Euston Road, N.W.1.

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Classified Advertisements (*PLANT FOR SALE, contd.*)


# RING BELLS for machine tools

LEEDS 63-7398


**No. 16 Herbert Vertical Milling** Machine. Table 55in. × 13¼in. Long traverse 34in. 16 speeds 16-427 r.p.m. S.C. motor.

No. 2 Edgwick Vertical Milling Machine with power operated rotary table. Table 46in. × 11in., long. traverse 26in. Spindle bored No. 40 S.M.T., 5 h.p. 400/3/50 motor, 9 speeds 37-605 r.p.m.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

**Lang 8½in. S.S. & S.C. Centre** Lathe taking 5ft. 0in. between Centres. Complete with 2 Speed Motor giving 16 Spindle Speeds, Taper Turning Attachment. Excellent condition.

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2in. **CONOMATICS.** 4-spindle.
1¼in. **CONOMATICS.** 6-spindle.
1½in. **CONOMATICS.** 4-spindle.
Wartime Machines.

BOX C725, MACHINERY,
Clifton House, Euston Road, N.W.1.

**Taylor & Challen Power Press** B.3½, 60 ton cap. Adjustable stroke ½-4in. Roll feed and cutter fitted.—BOX C692, MACHINERY, Clifton House, Euston Road, N.W.1.

**Brown & Sharpe Omniversal** No. 0 Toolroom Milling Machine. in AS NEW condition. Todays new price around £6,000, will accept £2,000.—BOX C728, MACHINERY, Clifton House, Euston Road, N.W.1.

**Cincinnati O-8 Vertical Milling** Machines. Table working surface 20in. × 6in. Automatic cycle. Good condition. £250 each.—BOX C554, MACHINERY, Clifton House, Euston Road, N.W.1.

**Kendall & Gent Profile Milling** Machine, with twin spindle. S/No. 10953A. Asquith Twin spindle Profile Milling Machine, spindle speeds 250 to 3,000 r.p.m.—BOX C555, MACHINERY, Clifton House, Euston Road, N.W.1.

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Classified Advertisements (*PLANT FOR SALE, contd.*)

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BY ORDER OF THE SECRETARY OF STATE FOR WAR. 37th Sale

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**CENTRAL ORDNANCE DEPOT, BICESTER, OXON.**

Important Sale by Auction by

**MIDLAND MARTS LIMITED**

of

**GOVERNMENT SURPLUS GENERATORS AND SPARES, ENGINEERING SPARES, STEEL SCAFFOLDING, VEHICLESPARES, AND GENERAL STORES, Etc.**

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Norton Crankshaft Grinder, Churchill Crankshaft Grinder, Heenan & Froude Baling Press, Compressors, Winches, Industrial Trucks, Bench Grinders, Burdett Vertical Metal Shaper, Vehicle Washing Plants, 136 Lathe Chucks, Engineer's Vices, Large Quantity of Machine Tool Cutters, Grinding Wheels and Spare Parts, Diamond Cup Lapping Wheels, Diamond Nibs, etc.

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Catalogues, price 1s., to admit two to view and one on sale days, from the Auctioneers, Midland Marts Limited (Dept. 14), Market Square, Bicester, Oxon (tel. 73 and 533).

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Re: Berkeley Coachworks (Sales & Export) Ltd.

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**HENRY BUTCHER & CO.,**

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Messrs. HENRY BUTCHER & CO., 73, Chancery Lane, London, W.C.2. Telephone: HOLborn 8411(8 lines).

# SITUATIONS VACANT

*If you do not wish your reply to any Box No advertisement in this section to be forwarded to certain firms, please advise us. Your reply will then be destroyed, but you will not be notified as this would disclose the identity of the advertiser.*

**MACHINE TOOL SALES ENGINEER.** Vacancy occurs on Sales Staff of well-established Company, for keen man with proved selling experience and regular contact in Midland Area. Salary, Commission, car, expenses. Application treated in confidence.

**BOX C709, MACHINERY, Clifton House, Euston Road, N.W.1.**

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**Machine Shop Foreman Required** for small precision engineering factory, North London. All-Round mechanic offered well-paid job.—Apply BOX C670, MACHINERY, Clifton House, Euston Road, N.W.1.

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**Practical Engineer Required to** take charge of production of small precision machine shop, N.E. London. Top paid job.—Apply BOX C668, MACHINERY, Clifton House, Euston Road, N.W.1.

**Highly Paid, Secure and Interest-** ing posts are always available for technically trained men. Find out how you can put some letters after your name by preparing at home on "No Pass—No Fee" terms. A.M.I.Mech.E., A.M.I.Prod.E., A.M.S.E., City and Guilds, etc. Full details of exams. and hundreds of courses in all branches of Engineering, Draughtsmanship, Management and Automation Techniques, the benefits of our Employment Dept., and unique record of 95 per cent. successes are given in "Engineering Opportunities"—a valuable 148-page Guide which will reveal many chances you are now missing.—Write for your copy today (stating subject of interest).—FREE and without obligation, B.I.E.T. (Dept. 43a), 29, Wright's Lane, London, W.8.

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**New Lathe Chucks at Bargain** prices, Pratt, Taylor, etc., 3-jaw and 4-jaw 5in. to 26in.—List from EUCO TOOLS, 44, London Road, Kingston, Surrey. 'Phone: Kin. 9029.

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**EXPERIENCED REPRESENTATIVE**

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**Canal Street Works, Nottingham.**

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**Representative Required by** Machine Tool Merchants dealing in New and Used Machine Tools. Must have sound technical knowledge. Preference to applicant living in Leeds area.—BOX C711, MACHINERY, Clifton House, Euston Road, N.W.1.

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**HYDRAULIC ENGINEERING TECHNICAL SALES ENGINEER FOR MIDLANDS**

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**Technical Representative/Service** Engineer required by leading North of England machine tool merchants. Fully conversant with all types of machine tools normally used in toolroom and production shops. Preferably resident in the Merseyside area. Transport provided: excellent pension scheme in operation.—Apply with full details experience to date, etc., to BOX C691, MACHINERY, Clifton House, Euston Road, N.W.1

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**Old Established Machine Tool** Merchants with reputable agencies and handling new machines only require two experienced representatives with connections to operate London area. Salary, commission, expenses. Car provided.—Write in confidence, BOX C647, MACHINERY, Clifton House, Euston Road, N.W.1.

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# SITUATIONS WANTED

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## REPRESENTATIVE

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**1¾in. 5-Spindle Wickman Bar** Machine. — BOX C674, MACHINERY, Clifton House, Euston Road, N.W.1.

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HELLER Milling Machines,
Model FV120.
Model FH120.
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Good prices ready for the right machines.
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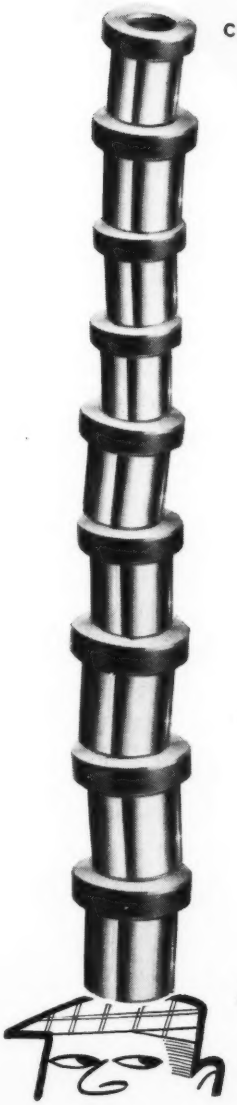

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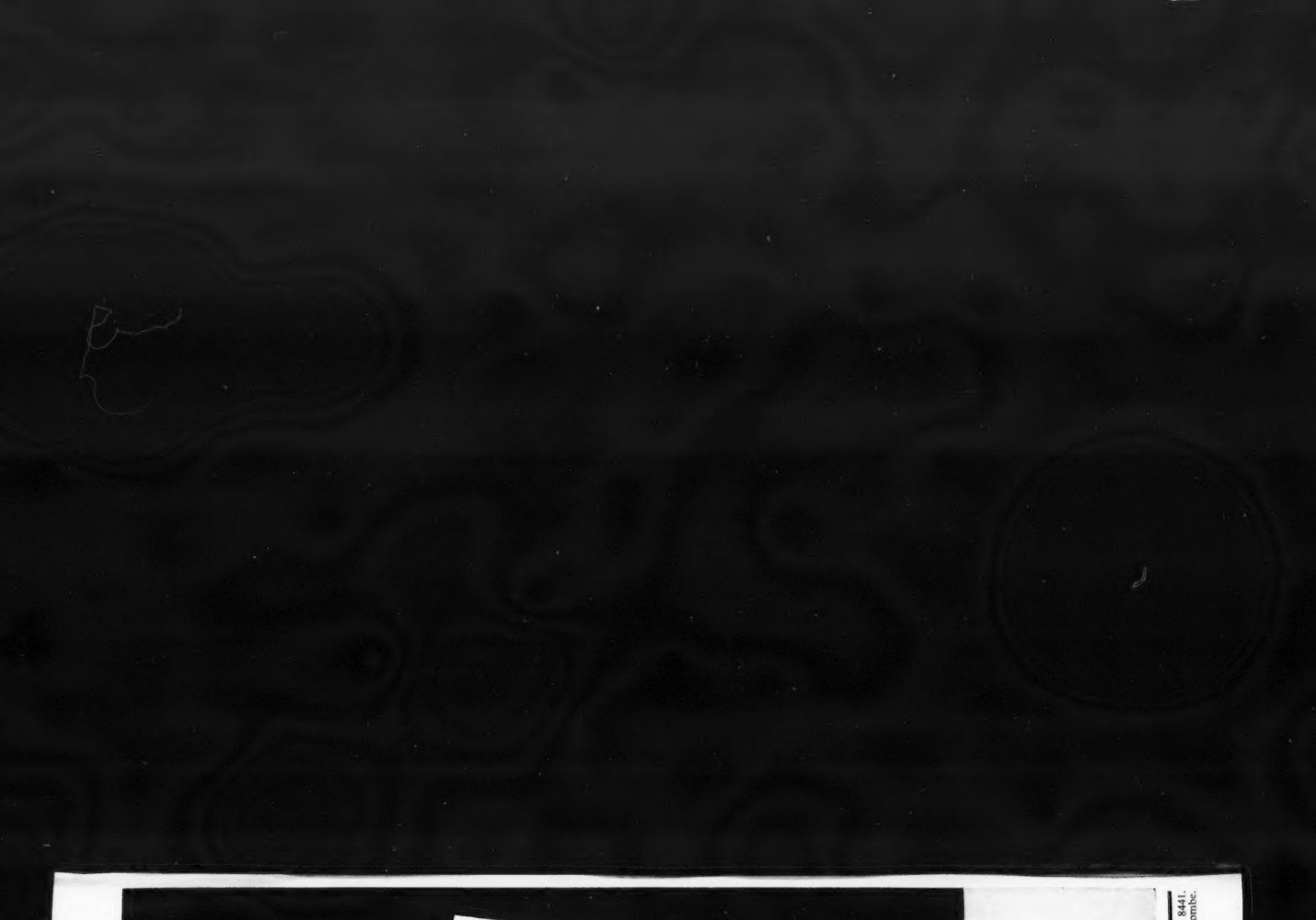
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